Marine Review

SHIP OPERATION SHIPBUILDING CARGO HANDLING

The National Publication Covering the Business of Transportation by Water

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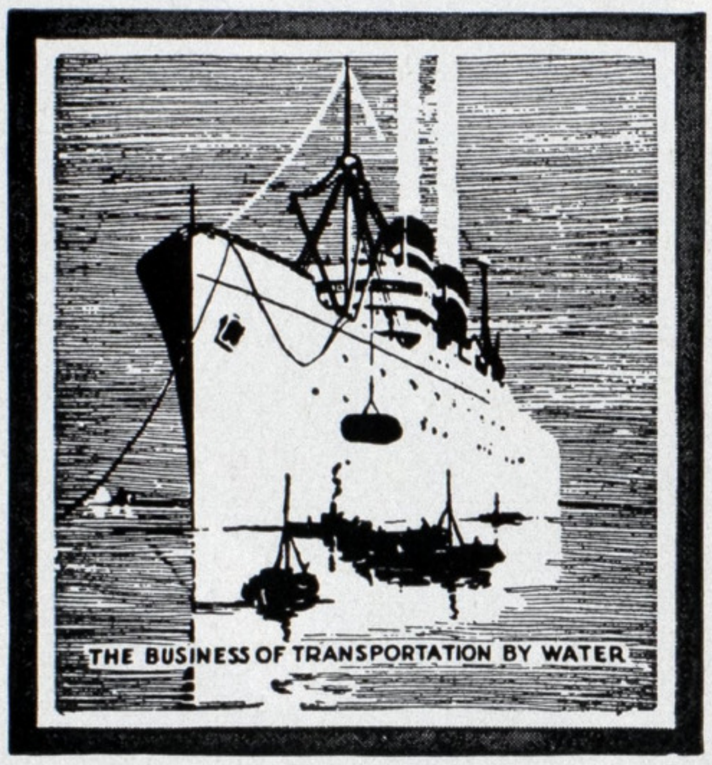

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« EDITORIAL »

The New Administration and The Merchant Marine

A NEW administration has taken hold of affairs at Washington. So swift and decisive have its actions been in meeting immediate emergencies that probably never before in our history has a new government so quickly earned and won universal approval and support from all sections of the country.

It is only natural in view of the crisis it has had to deal with and the short period that has elapsed since it took office, that in the meantime only routine matters of general policy have so far received attention.

One of these routine matters was the reappointment of Admiral Hutch I. Cone as a member of the shipping board and his designation as chairman. Also, the appointment of Capt. Gatewood S. Lincoln and Capt. David W. Todd as successors to the two retiring members, Chairman T. V. O'Connor and S. S. Sandberg.

No one needs to feel any concern about the ship-mindedness of Admiral Cone and his two new colleagues. They will strictly adhere to the fixed policy of congress for the development of the country's commercial shipping. In this they will be backed to the fullest extent by President Roosevelt. The President's traditions and background are deeply rooted in maritime affairs. There is every reason, therefore, to feel that the new government will use every effort to continue and to pursue, even more energetically if possible, the policy of building up an adequate merchant marine.

In the congress also the merchant marine will have its staunch supporters, and it is not believed that any body of opposition can be developed to weaken the present policy.

It will be necessary, however, when plans are formulated for the consolidation of all kinds of transportation under one central head to see to it that this will not mean any tendency to neglect the vital interests of the merchant marine.

No one will object to a rearrangement of government bureau activities, including the functions of the shipping board and Merchant Fleet Corp. unless under the new arrangement definite leadership and aggressiveness are replaced by routine bureaucratic management. Under any projected rearrangement it is absolutely essential that the American merchant marine be represented by an intelligent, courageous, forceful and untrammeled leader, who can and who will act as its spokesman at all times. Those leaders in congress who have been instrumental in bringing the attention of the country to the need of a strong merchant marine for the protection and increase of our commerce and as an absolute necessity in times of national danger would be the first to recognize the urgency for distinct and effective leadership in the executive department.

Some fear has been expressed by shipping men that the grouping of various agencies of transportation under one head might lead to a submergence of strictly maritime interests to a secondary or inferior position. It is, therefore, necessary to approach whatever reorganization is intended with a full realization of the fact that this vital arm of our transportation system must be represented by a leader of the highest qualifications and one who can not be submerged, furthermore that this problem is intimately connected with our national policy and welfare. The fate of a nation's merchant marine must be decided as a major national policy and cannot be treated as a humdrum bureaucratic function to be left in the hands of an appointed bureau chief.

We do not for a moment feel that there is any danger that the new administration will not understand the significance and the need of a real merchant marine if this nation is to hold its position in world affairs. On the other hand, we believe that the policy of the President and the new administration will be clear cut and that he will show the same admirable decision and action in the case of the merchant marine as he has in other major problems.

A Roosevelt, indifferent and lax about his country's ships of commerce, or its navy, is absurd. The President will, we feel confident, consolidate the gains already made and pursue a vigorous merchant marine policy which will give the United States the position it rightfully should have on the oceans of the world.

Ranger, New Airplane Carrier Successfully Launched

THE navy's new airplane carrier RANGER was launched at the yard of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., Feb. 25, 1933 amid the cheers of thousands of workmen and spectators while dozens of nearby craft welcomed her entrance into the waters of the historic James river with their sirens. The RANGER was sponsored by Mrs. Herbert Hoover, then first lady of the land.

The RANGER until her christening was known as HULL 353. The date of contract is Nov. 1, 1930 and the keel was laid Sept. 26, 1931.

Her general particulars are: Length over all, 765 feet, 0 inches; length between perpendiculars, 730 feet, 0 inches; breadth at waterline, 80 feet, 0 inches; breadth extreme, about 94 feet; depth molded at side, 51 feet, 0 inches.

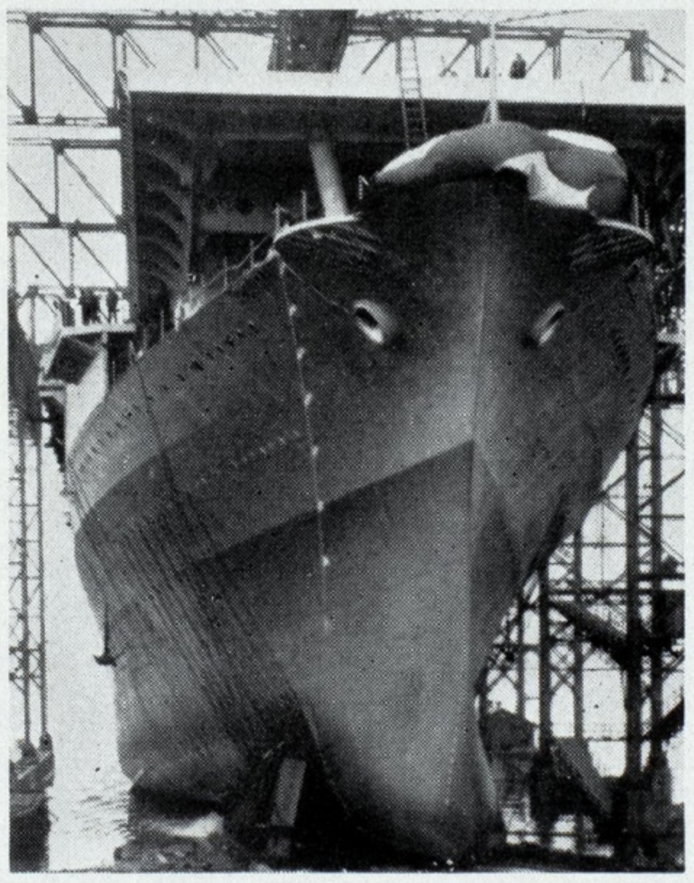
Some Launching Data

The total launching weight on the grease was 10,600 tons, giving an initial pressure of 2.2 tons per square foot. The keel was inclined 9/16-inch per foot and the inclination of the ground ways 5/8-inch per foot, without camber. The width of the sliding ways was 48 inches and the width of packing ways was 36 inches. The effective length of the sliding ways was 602 feet. At bulkhead 23 (forward) the keel was 44 inches above the ground ways. The depth of water over the way end ends at time of launching was 18 feet, 8 inches. Distance slid to pivoting (static) was estimated to be 419 feet. The estimated forepoppet pressure was a maximum of 2700 long tons. The maximum velocity during launching was 18 feet, 6 inches per second, or 11 knots.

With the promptness characteristic of Newport News launchings, the vessel started immediately when the powerful triggers were released, and rapidly gained headway, attaining a speed of 18 feet per second, only 40 feet from the start. Her speed of between 18 to 19 feet per second was maintained until she had slid over 500 feet, and the stern lifted. The pressures being moderate, there was no smoke and the vessel was fully waterborne before the huge forepoppets reached the way ends so there was no drop off, or "courtesy" as it is frequently called.

The vessel was moved to the outfitting dock by powerful tugs without incident. Two large anchors were provided to be dropped in the event high winds made her unmanageable. This precaution proved unnecessary as a light mild breeze prevailed.

The launching arrangements included several novel features. Her huge size and fine ends would have required an enormous amount of packing if arranged in a conventional manner. She was, therefore, supported throughout on vertical timbering resembling to some extent ordinary shoring. This was carefully secured against working and was mounted over four rows of crushing strips separated by fore and aft members. The crushing arrangements were also unusual in that they extended for the entire length of the



Airplane Carrier Ranger Launched at Newport News, Va., Feb. 25

ways including the forepoppet. This provided a cushioning to distribute the pressures and worked out very well as no bottom damage occurred.

Forepoppet pressures were considered high enough to require a particularly strong location in the hull structure. While the location selected placed the forward end of the forepoppet about 112 feet aft of the tip of the stem, a noticeably long overhang, it worked out satisfactorily with no damage in spite of the pressures.

Outfitting work is now proceeding. It is interesting to note that this is the first United States airplane carrier completely designed as such. Other plane carriers are in each case conversions from vessels originally developed for other purposes.

Federal Engineers from the Chicago district have been studying navigation conditions in the Pittsburgh district in connection with the proposed improvement of the Calumet and Sag canal near Chicago. Recently the Carnegie Steel Co.'s, Clairton, Pa. plant was inspected as well as the Colona, Pa. river and rail transfer dock and also the Neville Island marine railway.

John H. Smith, formerly of the Westinghouse company and directly connected with the condenser industry since 1910 has recently been appointed vice president of the Condenser Service & Engineering Co. Inc. His headquarters will be at 61 Broadway, New York City.

This is in furtherance of the company's policy of rendering a complete engineering service to users and prospective purchasers of surface condensers and other tubular heat exchange equipment.

Encouraging Reports on Shipping Operations

On Mar. 16 in an address to shareholders of the United Fruit Co. Francis R. Hart, recently elected president, said in part:

"One of the bright spots is the slightly increasing volume of passenger business. Advanced bookings indictate a fair spring and summer business; the greater diversity and shorter length of time required to make vacation cruises has apparently increased the popularity of the Caribbean countries as all year vacation resorts.

"During 1932 although there was a widespread curtailment of travel the Great White fleet carried 44,489 passengers. Southbound freight shipments continued distressingly light. We carried last year 540,000 tons of general cargo in addition to transporting 1,124,188 tons of our own fruit and other products."

Mr. Hart pointed out that the company maintained its strong cash position and that it had on hand $27,067,917 at the close of the year or nearly $1,000,000 more than in 1931. This sum was held in cash, United States government notes and certificates on hand. Furthermore, this amount, Mr. Hart noted, does not include $10,000,000 insurance funds invested in United States government bonds. The net income for 1932 was $5,707,221 after depreciation, interest and taxes which is equal to $1.95 per share as compared with net earning of $6,779,361 in 1931 or $2.31 a share.

A favorable report has also been issued by the Merchants and Miners Transportation Co., Baltimore. For the year ending Dec. 31, 1932, net income was $500,750 after depreciation interest and federal taxes. This equals $2.10 a share on 238,163 shares against $314,721 equal to $1.29 a share on 244,499 shares in 1931.

Advancement in Marine Engineering

Is Most Active During Slack Times

By Frank V. Smith

THE lull that came in shipbuilding after the completion of the war building program was a good thing for the art of marine engineering. It gave time for reflection and for growth of progressive ideas. Hurriedly built ships, ships built of steel, wood and concrete, and propelling machinery built largely from borrowed designs, all proved to be a laboratory for research. During every depression, whether it be in commerce, art, or engineering, the majority of people on the sidelines feel that civilization is retrogressing towards some older order. Looking back over the lean years from 1921 to 1927, one can note that real progress was made and that the careful planning during that period provided the background upon which a new order was evolved.

Breaking Away From Precedents

Breaking away from the precedents set by reciprocating engines, Scotch boilered ships was a difficult task. Steam pressures which had become more or less standardized at 200 pounds were one handicap that had to be overcome before the turbine could come into its own—the prejudice against the use of superheaters another. Steam auxiliaries which had developed along with reciprocating engine drives proved to be another real hindrance. A real war had to be carried on on all fronts before the birth to modern engineering practice could take place. It meant the re-education of the shipowners, the shipbuilders, the personnel operating the ships, the scrapping of antiquated tool equipment and the formulation of new methods in the construction of ships.

Looking over the ships built since the passage of the Jones-White act, there is evidence that the war for modernization has been won. Scotch boilers have given way to water tube boilers. High pressure, high temperature steam is meeting with ready acceptance. Air preheaters and economizers are being adopted. Auxiliary electrification has become standard practice. Series feed water heating by the extraction method is no longer a curiosity. The results of these new innovations and the planning of well balanced plants around the turbine have resulted in fuel rates of from 0.60 to 0.70 pound of oil per propeller shaft horsepower per hour in place of the 1.0 to 1.2 pounds established on ships built during the war period.

A few ships built prior to 1928 adopted some of the newer measures in part, but not in full. In some cases, high pressure, high temperature steam was adopted but not auxiliary electrification. Other ships adopted series feed water heating but omitted air preheaters or economizers. As each feature carried its own definite economic return, the sum total of the gains differed in all cases. Differences in ultimate values were generally accredited to the type of propelling machinery and transmission alone, whereas in reality, they were due to the combination of external factors involved. Differences in the type of transmission between the turbine and propeller shaft could never account for the wide variations brought about by the innovation of auxiliary electrification, modern boiler plants, and modern steam conditions. The last few years have brought about a much better understanding of the fundamentals of the newer engineering, and there is reason to believe that shipowners are becoming more interested than ever before in the facts that lie behind the scenes.

Improvements Gradually Adopted

The first ships to be launched after the passage of the Jones-White act dipped but lightly into the newer engineering—just enough to open the doors to modern practice and to bring into view what the designers had been doing with their spare time. The S. S. CALIFORNIA adopted 250-pound pressure steam with 100 degrees of superheat. It also adopted almost complete auxiliary electrification, but heated the feed water to only 230 degrees Fahr. Standard marine type boilers without air preheaters or economizers were also used. The fuel result based on 18,500 B.t.u. oil was 0.76 pound per shaft horrsepower hour. The S. S. VIRGINIA, a sister ship which followed, adopted 275 pound steam pressure with 200 degrees of superheat, without any other changes, and the fuel rate was 0.72 pound—a gain of slightly over five per cent.

Should a steam pressure of 550 pounds and a temperature of 725 degrees Fahr. be chosen, the fuel rate would have been 0.66 pound, based on 18,500 B.t.u. oil and 28.5 inches of vacuum. Add air preheaters to the boilers, furnish a high pressure, feed water heater to heat the feed water to 300 degrees Fahr., furnish power for the auxiliaries from the main unit by means of a motor generator set, and correct the fuel results to the standard of 19,000 B.t.u. per pound, and the vacuum to 29.0 inches, and the fuel result becomes 0.558 pound per shaft horsepower per hour for all purposes. A drop in fuel rate from 0.76 to 0.558 represents a gain of 29 per cent, all due to factors external to the type of transmission.

The progress during the past few years has all been made along the foregoing lines, and the end is not yet in sight. Continuous advancement is being made in the metallurgical arts, and this in turn is going to permit of higher pressures and temperatures and of higher turbine speeds. Some of the later ships have adopted 425 pound pressure steam at 750 degrees Fahr. total temperature. The new Grace line ships, SANTA ROSA and class, have not only adopted the foregoing steam conditions, but have electrified all of the pumps (including the feed pump) attached the auxiliary generators to extensions of the gear pinion shafts, and fitted air preheaters on the boilers of two ships, and economizers on the boilers of two other ships. The fuel results are below the 0.60 mark, and studies along similar lines of advancement show that 0.50 pound are not over optimistic for the near future.

Equipment of Better Design

In addition to the progress made in the thermal conditions, the methods of salvaging low-head heat, the application of regenerative cycles, and the attainment of proper heat balance, great progress has also been made in the design, construction and efficiency of the individual pieces of apparatus making up a ship's equipment. Progress made in the art of welding and in the processes of manufacture has been instrumental in reducing weights, space requirements, and costs.

Turbines have been greatly improved in design and efficiency, and

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The author, Frank V. Smith, is a member of the staff of the Federal & Marine Department, General Electric Co.

Rankine cycle efficiencies at the turbine shaft now hover around the 80 per cent mark. During the war, building program, efficiencies ranged from 65 to 70 per cent. This gain of from 12½ to 19 per cent is the result of more favorable turbine speeds, of the more liberal use of superheat, and of internal design improvements.

The viewpoint and the knowledge of the operating departments of ships have undergone a complete change during the past ten years. It was not so long ago that the detrimental effect of air leakage into a condenser was but hazily understood. Likewise, proper air regulation to oil fired furnaces received but scant attention. Leaky stuffing glands, pumps that hammered, and steam leaks were all taken as part of the day's work.

Operating Personel Recognize Value

Most of the engineers serving on ships ten years ago had come up through the school of hard knocks and served their time in the firerooms of coal burning ships. They shuddered to think of going to sea with motor-driven auxiliaries, and they wanted boilers that carried lots of water. This is all water over the dam now, but was a grim reality a few years ago.

The past year has again given time for reflection, engineers have been busy at their drafting boards, and new advancements are in the offing. When business starts, somebody will open the door cautiously at first, and then the art of marine engineering will take another spurt. One thing is certain, we are not going backward.

Dry Dock at Southampton

One of the largest terminal developments in the world including the largest graving dock in the world, will be completed at Southampton, England, it is expected, before the end of this year. The ocean quay will be able to berth at the same time eight of the greatest ships now afloat or projected. Work on the quay was begun in 1927, while work on the graving dock was authorized in November, 1930. The latter is likely to be finished during the summer months. The whole project will cost, when completed, approximately £13,000,000.

The new graving dock has a length of 1200 feet, a width of 135 feet at the entrance, and at high water will have a depth of 45 feet at neap and 48½ feet at spring tides.

Estimates have been made that the dock can be pumped dry, without a ship in place, in about 4 hours. Four centrifugal pumps each driven by a 1250 brake horsepower electric motor will discharge the 270,000 tons of water which the dock holds, in this time.

Appoint Shipping Board Commissioners

The future status of the shipping board is likely to be affected under the economy program calling for reorganization of numerous government bureaus and activities, but for the time being at least, it will continue to function as heretofore. President Roosevelt has appointed, and on March 20 the senate confirmed, the following as members of the United States shipping board: Admiral Hutch I. Cone, Florida, Capt Gatewood S. Lincoln, California, and Capt. David W. Todd, New York. Admiral Cone was designated as chairman of the board by the President.

On taking office the new board began reorganizing the shipping board and its subsidiary, the Merchant Fleet Corp. for the purpose of speeding up the liquidation of the government fleet and effecting other economies. This work is preparatory to the proposed merger of all government transportation activities.

Admiral Cone, reappointed from the board as previously constituted, stated that in working out its plan of reorganization the new board will do nothing to impair the splendid work already performed in building up a strong merchant marine. The policy laid down by congress for the development of the country's commercial shipping will be strictly adhered to. American citizens who with characteristic enterprise have embarked in the hazardous field of ocean transportation will continue to receive the wholehearted co-operation of those charged by law with the establishment and maintenance of the merchant marine.

In short, the new board, one hundred per cent sea-minded, may be counted upon to exert its best efforts to promote, foster, and carry to a still higher plane of development an industry which plays so vital a part in our foreign trade and national defense.

In the new appointments made, Captain Todd succeeds Mr. O'Connor as commissioner from New York and Captain Lincoln succeeds S. S. Sandberg from California. The services of former chairman, T. V. O'Connor, are referred to in the adjoining column. Captain Sandberg brought to his work at the shipping board long practical experience in shipping matters, and his services as commissioner representing the West coast were of the highest order and universally commended by shipping men.

Status of Cunarder

According to latest reports negotiations are continuing between representatives of the Cunard line and the British government in an attempt to evolve a plan for the resumption of work on the Cunard superliner "534" now on the stocks at John Brown & Son shipyard on the Clyde.

The latest information available at this time is that the government is suggesting cooperation between the Cunard company and the White Star line, and that in the event of this being worked out that the White Star line would build and operate a ship similar to the partially completed Cunarder. If this plan goes through, wasteful competition would be eliminated and the two powerful transatlantic shipping rivals would cooperate in the operation of the two superliners. The government is evidently of the opinion that a second vessel is necessary if Great Britain is to maintain its prestige and position in the transatlantic service.

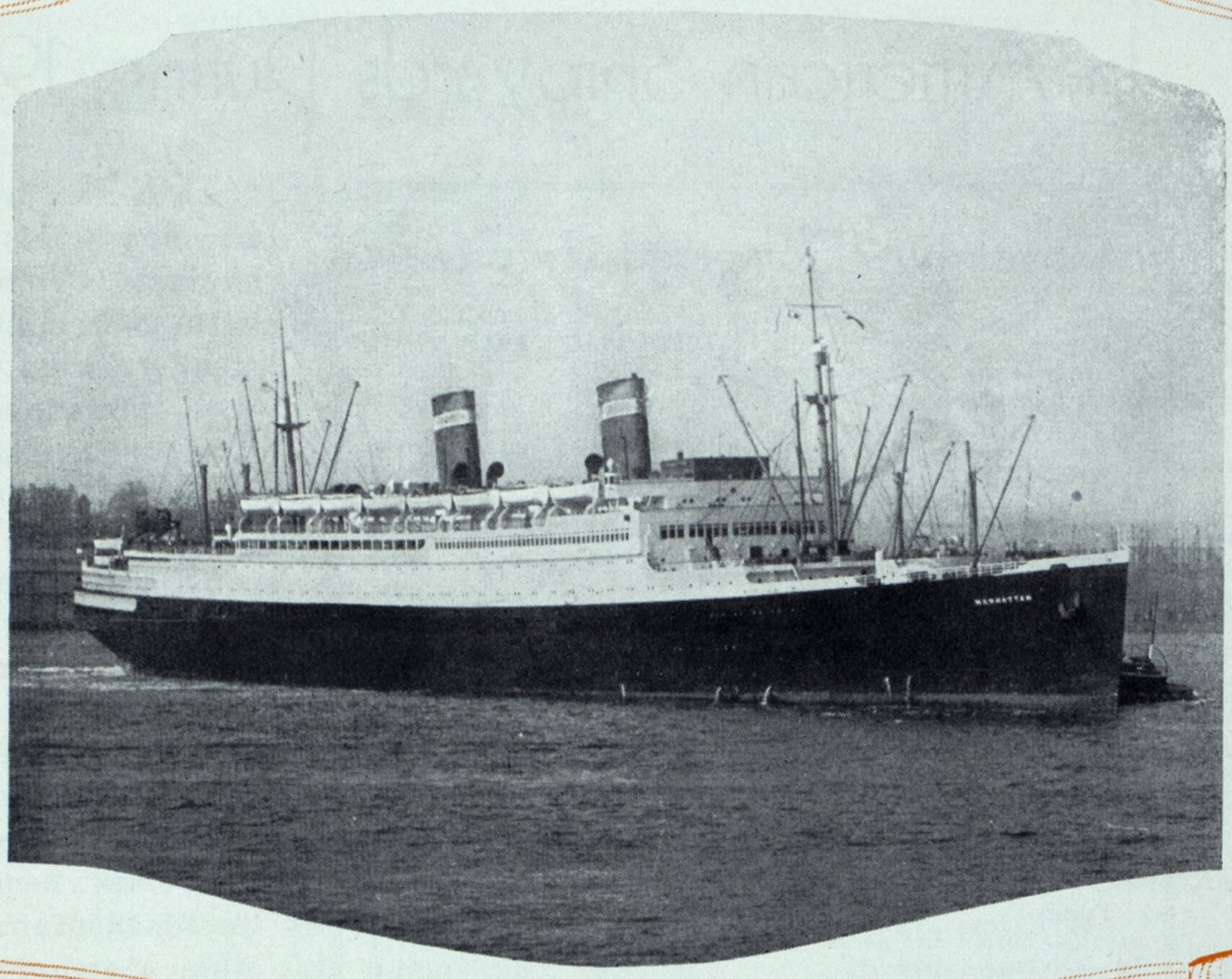
T. V. O'Connor Retires as Head of Board

For twelve years a member of the shipping board and for nine years its chairman, T. V. O'Connor, Buffalo, retires from his activities as the new administration takes charge. During his tenure of office he has given to the American merchant marine the highest type of intelligent and effective service. He has a record of achievement rarely equaled in official circles. Throughout his term he demonstrated singleness of purpose and outstanding courage in his vigilant protection of the best interests of the merchant marine.

Mr. O'Connor was appointed a member of the board representing the Great Lakes district by President Harding in 1921. From the beginning there was never any question where he stood with reference to developing an efficient and powerful merchant marine. On the resignation of Albert D. Lasker in 1924, he was appointed chairman by President Coolidge and continued in this office throughout the Coolidge and Hoover administrations.

It is fair to say that more than any other single individual he accepted and acted in the role of leader in advancing the cause of the merchant marine. His great influence and intimate knowledge of merchant marine affairs were an invaluable aid in the formulation and the successful passage of the Jones-White act of 1928.

When time allows the history of this period to be fairly recorded, it will evaluate highly the part taken by the former chairman. This period may well be known as the real beginning of the renaissance of the American merchant marine, and no figure stands out more clearly as a disinterested leader in bringing it about than T. V. O'Connor. The entire shipping world extends to him its best wishes on his retirement.



Marine Progress

shown by

DISTINCTIVE SHIPS

Marine Review

April 1933

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SHIPBUILDING

In American Shipyards During 1932

IN THIS review of American merchant type steel shipbuilding for the tenth consecutive year, it is evident that two factors have seriously affected the number and tonnage of vessels under construction during the calendar year 1932. The first factor is the slowing up in the program of new construction on account of mail contracts; that is, the major portion of the immediate new ships so required has been completed. There are important additional requirements still to be fulfilled under the older contracts and in the case of contracts recently let; also under contracts now up for consideration. The other factor is the reduction in the building of other types of craft due to the business depression.

The wisdom of continuing building up a real American merchant fleet has been strikingly demonstrated in the universal success of the new ships in attracting patronage. From this it is evident that the public will not be satisfied to use outmoded and obsolete ships. Furthermore, the new ships having had the benefit of the great improvements in marine engineering are far more economical to operate than the older ships.

Motive Power Compared--Two Years

Types	Number 1932	Number 1931	Per Cent 1932	Per Cent 1931
Steam reciprocating coal burner	2	6	2.7	6.4
Steam reciprocating oil burner.	14	16	18.7	17.0
Steam turbine oil burner.....	16	26	21.3	27.7
Diesel engine direct drive.....	35	31	46.6	33.0
Diesel engine electric drive....	3	5	4.0	5.3
Turbine electric oil burner.....	5	10	6.7	10.6
Totals.....	**75**	**94**	**100.0**	**100.0**

Recapitulating for Primary Power

Types	Number 1932	Number 1931	Per Cent 1932	Per Cent 1931
Steam—As primary power.....	37	58	49.3	61.7
Diesel—As primary power.....	38	36	50.7	38.3
Totals.....	**75**	**94**	**100.0**	**100.0**

Recapitulating for Power at Propeller

Types	Number 1932	Number 1931	Per Cent 1932	Per Cent 1931
Steam—Direct and gears.....	32	48	42.6	51.1
Diesel—Direct drive.....	35	31	46.7	33.0
Electric—Steam and diesel....	8	15	10.7	15.9
Totals.....	**75**	**94**	**100.0**	**100.0**

Recapitulating for Fuel

Types	Number 1932	Number 1931	Per Cent 1932	Per Cent 1931
Steam—Burning coal.....	2	6	2.7	6.4
Steam—Burning fuel oil.....	35	52	46.6	55.3
Diesel—Diesel oil as fuel.....	38	36	50.7	38.3
Totals.....	**75**	**94**	**100.0**	**100.0**

As in the previous nine years, this year's analysis is concerned with merchant type steel vessels fitted with power of 100 feet in length and over, or of 100 gross tons and over, under construction in any stage, or contracted for, in American shipyards during 1932. From year to year the same plan presenting these records has been followed. Insofar as possible a complete list is given of all vessels

For the year 1932, 75 vessels are so listed on pages 38 and 39. It is interesting to note that for the years 1931, 1930 and 1929, a similar listing included, respectively 94, 130 and 145 vessels as under construction. In order to portray clearly the type of vessels under construction in American shipyards during 1932, we have selected 17 distinctive vessels for description, with photograph, line plan and essential particulars, a full page being devoted to each one.

In the following pages, these 17 selected ships, because of sister ships, cover principal particulars of hull and machinery for a total of 35, or nearly one -half of all the vessels listed on pages 38 and 39. Care has been exercised in making this information authoritative as it has been obtained directly

Analysis of Power and Gross Tonnage of Vessels Listed on Pages 38-39

Type of Power	Number of Vessels	Total Gross Tons	Total Horsepower	Average Gross Tons	Average Horsepower
Turbine Electric.	5	34,909	52,500	6,982	10,500
Turbine Gears...	16	169,680	209,900	10,605	13,119
Reciprocating...	16	13,337	14,667	834	917
Diesel Electric...	3	772	1,500	257	500
Diesel Direct....	35	11,216	23,530	320	672
Totals.....	**75**	**229,914**	**302,097**	**3,066**	**4,028**

either from the shipyard, the naval architect or the owner. The distinctive ships featured in this issue represent a striking panorama of recent American shipbuilding and the uniform specific information given makes possible a ready comparison of one with another. From river craft to ocean liners in the ten years in which a similar presentation has been made in MARINE REVIEW no less than 238 steel merchant type craft have been described and illustrated in this uniform manner.

ANALYSIS OF AMERICAN MERCHANT SHIPBUILDING—1932
COMPILED BY MARINE REVIEW

TYPES OF VESSELS	NUMBER	TURBINE OIL	TUR. ELEC. OIL	DIESEL OIL	DIES. ELEC. OIL	RECIP OIL	RECIP. COAL
PASSENGER—OCEAN	17	12	5				
FREIGHTER—OCEAN	2	2					
FREIGHTER—COAST	1			1			
FREIGHTER—LAKES	1			1			
TANKER—COAST	2			2			
TANKER—HARBOR	2			2			
FERRY—HARBORS	2			2			
TOWBOAT—HARBORS	8			7	1		
TOWBOAT—LAKES	1				1		
TOWBOAT—RIVERS	6			5		1	
DREDGE—LAKES	2	1					1
DREDGE—BAYS, RIVERS	13			2		10	1
SPECIAL—OCEAN	9			7		2	
SPECIAL—COAST	2				1	1	
SPECIAL—LAKES, BAYS	7	1		6			
TOTALS	75	16	5	35	3	14	2

It has also been possible to present by actual count the type and power of main machinery fitted. For this purpose an analysis has been made for each year and a comparison given for the preceding year. In this way, from year to year, definite information is available on the use of oil and coal as fuel and on the types of machinery such as the reciprocating steam engine, geared turbine, turbine electric drive, diesel direct drive and diesel electric drive.

The accompanying tables present an interesting analysis on the types of vessels, motive power, average size, and fuel used. In this connection it is interesting to note that only two of the vessels listed as under construction last year are fitted for burning coal. Of the 75 vessels listed 16 are fitted with turbine geared drive, representing 21.3 per cent of the total number, but the gross tonnage of these 16 vessels amounted to 169,680 or 73.8 per cent of the total gross tonnage of all vessels listed. In total horsepower these 16 vessels account for 209,900 or 69.5 per cent of all the horsepower for the 75 vessels. Average gross tonnage of the five vessels fitted with turbine electric drive is 6982 and the average horsepower is 10,500, both being considerably less than the average for turbine geared drive.

In number of units diesel direct drive has been fitted in 35, representing 46.6 per cent of the total number of vessels listed, while diesel electric drive has been fitted in 3, representing 4 per cent, making a total of 50.6 per cent in number of units fitted with diesel as primary power. In gross tonnage and horsepower, however, diesel direct drive represents only slightly less than 5 per cent of the total gross tons and 7.8 per cent of the total horsepower.

It is evident from this analysis of type of power, allowing for certain natural fluctuations, that the same general tendency noticeable in recent years is still continuing.

Distinctive Ships—Where To Find Them

Passenger Ships

Name and Service	*Page*
Acadia, Ocean, Passenger, Freight	21
Antigua, Ocean, Passenger, Freight	17
Colombia, Ocean, Passenger, Freight	19
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Manhattan, Ocean, Passenger, Freight	15
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Dredges

Capt. Meriwether Lewis, Western Rivers	23
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Freighters

Name and Service	*Page*
Seatrain New York, Ocean, Cargo	18
Wm. F. Kenny, Cargo Coastwise	30

Towboats

Dearborn, Great Lakes	32
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Special Types

Active, Patrol Boat, Harbor	26
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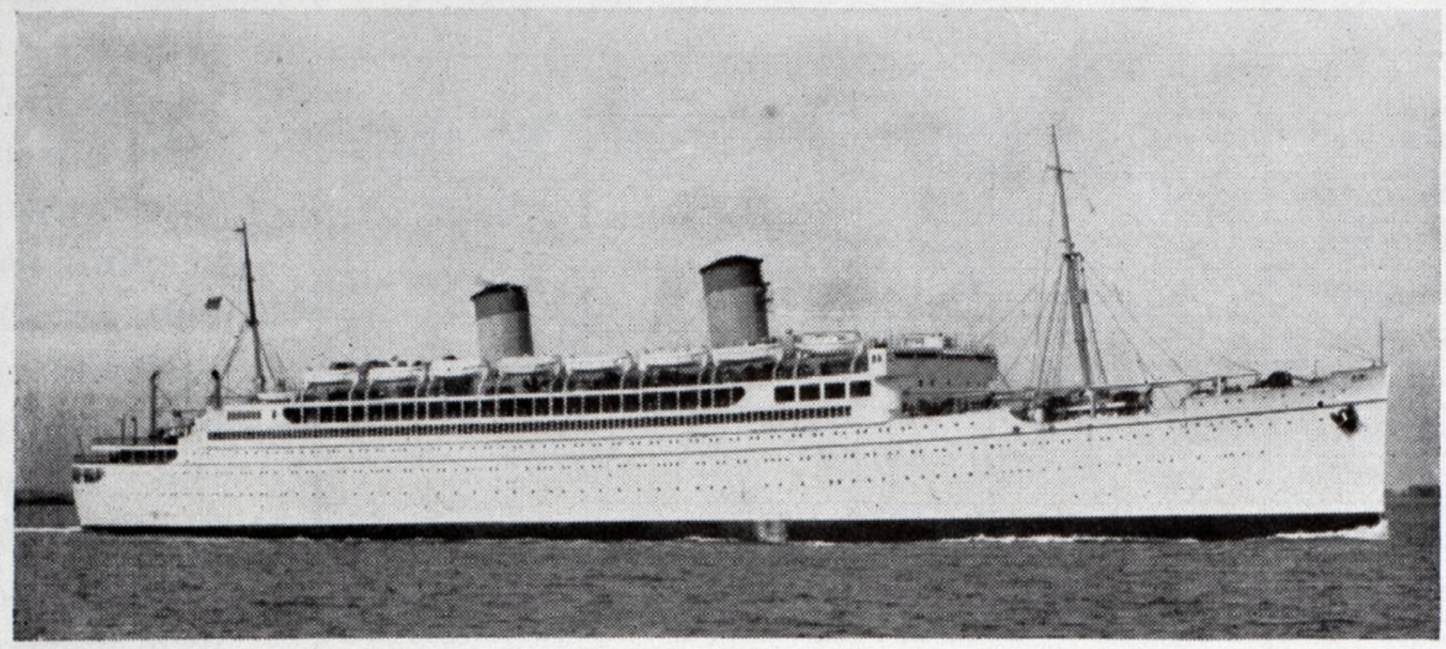
Galatea, Coast Guard Patrol	22
Hickory, Lighthouse Tender	24

See Pages 38-39, for Complete Shipyard Record

LURLINE—Passenger—Ocean—Twin Screw—Turbine



DESCRIPTION

Last of three large fast passenger and cargo ships for service between the West coast of the United States and Australia, New Zealand and the Islands of the Pacific. These three sistership are among the finest recent American ocean-going vessels. In construction, exceed safety requirements.

Name—LURLINE
Owner—Matson Navigation Co.
Builder—Bethlehem S. B. Corp., Fore River
Naval Architect—Owner and builder
Launched—July 18, '32; comp., Jan. 5, 1933
Sister Ships—MARIPOSA and MONTEREY, launched respectively July 18, '31, Oct. 10, '31; completed Dec. 14, '31; April 29, '32.
Classification—American Bureau of Shipping.

HULL PARTICULARS

Length over all, 631 feet 6⅝ inches; length between perpendiculars, 605 feet; breadth molded, 79 feet; depth molded to C deck, 52 feet, 9 inches; draft, 28 feet; displacement loaded, 26,141 tons; gross tonnage, 18,021; net tonnage, 10,559; passenger capacity, first class, 443; cabin class, 229; cargo capacity, in cubic feet, 309,622; bunker fuel oil capacity in tons, 6612; speed in service, 20½ knots.

MACHINERY PARTICULARS

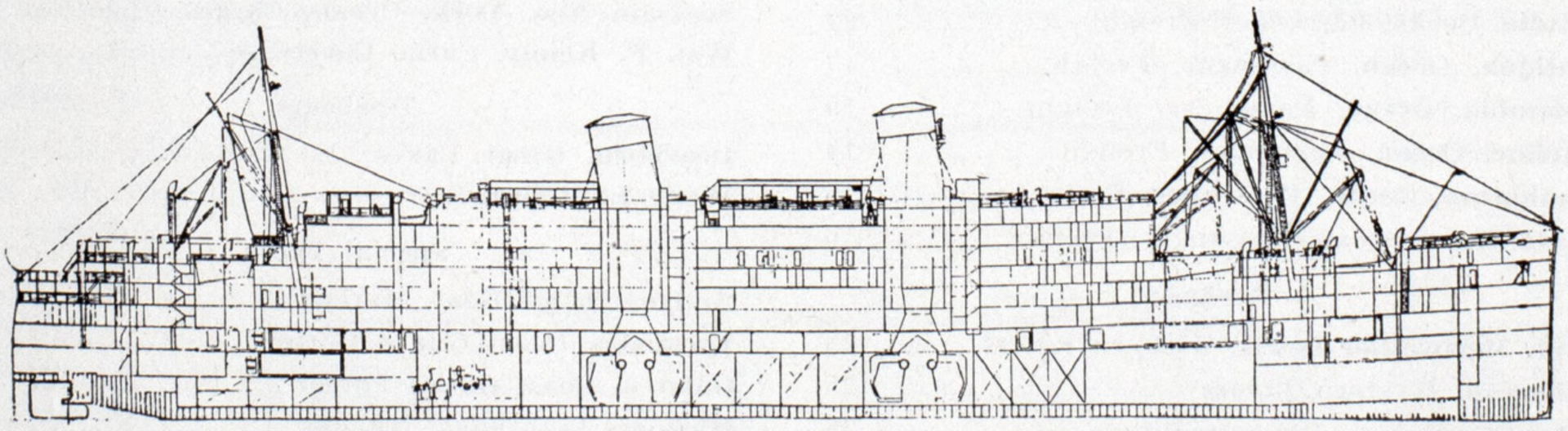
Main Engines—Two, three stage, single reduction, geared turbines of Bethlehem-Parsons type, built by Bethlehem Shipbuilding Corp. Ltd. The single reduction gearing of double helical type, furnished by Falk Corp. Total horsepower 22,000 at 125 revolutions per minute. For complete description of the sister ship MARIPOSA, see MARINE REVIEW for February, 1932.

Boilers—Twelve, Babcock & Wilcox water-tube marine boilers with a total heating surface of 53,520 square feet and total superheating surface of 4760 square feet; 32,112 square feet of air heating surface; working pressure, 400 pounds; 650 degrees Fahr., total temperature of steam; fuel, oil. Superheaters, desuperheaters, oil burning equipment, feed water regulators, air heaters and furnace brick supplied by The Babcock & Wilcox Co. Soot blowers supplied by Diamond Specialty Corp.

Generating Sets—Four, Westinghouse, geared turbine, 500 kilowatts each.

AUXILIARY EQUIPMENT

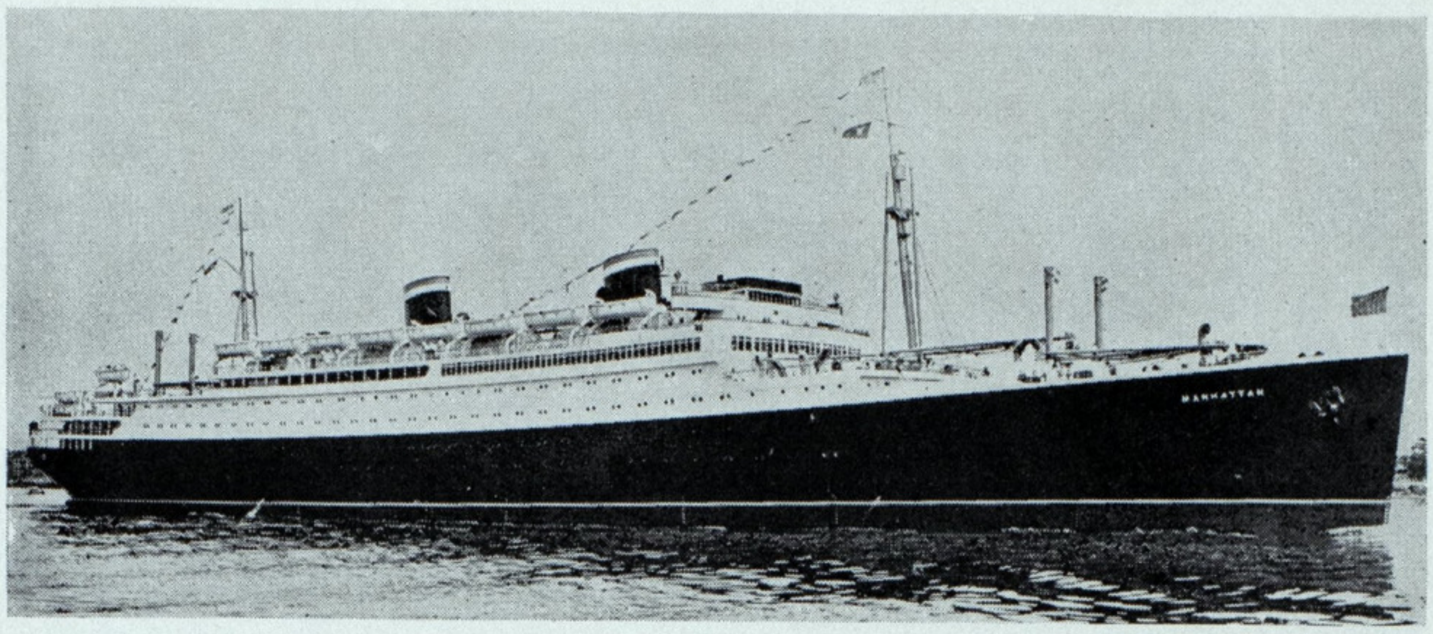
Pumps—Warren (principally)
Windlass—Bethlehem Shipbuilding Corp.
Winches—Allan Cunningham
Steering Engine—American Engineering Co.
Propellers—Cramp Brass & Iron Foundries
Refrigeration—Carrier-Brunswick
Capstans—American Engineering Co.
Generator (Auxiliary)—Atlas Imperial Diesel
Anchor Chain—National Malleable & S. C. Co.
Anchors—Baldt Anchor Chain & Forge Corp.
Storage Batteries—Electric Storage Bat. Co.
Fire Extinguishers—Walter Kidde & Co.
Combustion Recorders—The Permutit Co.
Radio Equipment—Radiomarine Corp.
Oil Purifiers—The Sharples Specialty Co.
Gyro Compass, Pilot Searchlights—Sperry
Windows—Kearfott Engineering Co.
Clocks—Chelsea Clock Co. (partly)
Telegraphs, Telephones—Chas. J. Henschel
Engines for Lifeboats—Standard Motor
Lifeboats, Davits—Welin Davit & Boat Corp.
Fathometer—Submarine Signal Co.
Electric Motors—Westinghouse Elec. & Mfg.
Emergency Generator—Westinghouse
Revolution Counters—Cummings Mach. Wks.
Finishes—E. I. duPont de Nemours & Co.
Fans, Blowers—B. F. Sturtevant Co.
Turbines (pump drive)—B. F. Sturtevant Co.
Feed Water Heaters, etc.—Davis Engineering
Deck Covering—Selby, Battersby & Co.
W. T. Doors (electric)—Cutler-Hammer
Refrigerators—General Electric Co



MANHATTAN—Passenger—Ocean—Twin Screw—Turbine

DESCRIPTION

Designed as a passenger and fast freight ship for service between New York and Hamburg, calling at Cherbourg and Southampton. Both towed and self-propelled model tests were carried out at the navy yard, Washington. A complete article on this vessel appeared in the September, 1932 MARINE REVIEW.



Name—MANHATTAN
Owner—United States Lines
Builder—New York Shipbuilding Co.
Naval Architect—E. H. Rigg
Launched—Dec. 5, '31; comp., Jul. 27, '32
Sister Ship—WASHINGTON; launched, Aug. 20, 1932; completed, April 27, 1933
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 705 feet 3 inches; length between perpendiculars, 666 feet; breadth molded, 86 feet, depth molded, to C deck, 47 feet; draft, 30 feet 8⅞ inches; displacement loaded, 33,557 tons; gross tonnage, 24,289; net tonnage, 13,924; passenger capacity, cabin, 573; tourist, 461; third, 196; cargo capacity, in tons, 4130; cargo capacity, cubic feet, 374,240 general and 47,090 refrigerated; bunker fuel oil capacity in tons, 4775; speed, 20 knots.

MACHINERY PARTICULARS

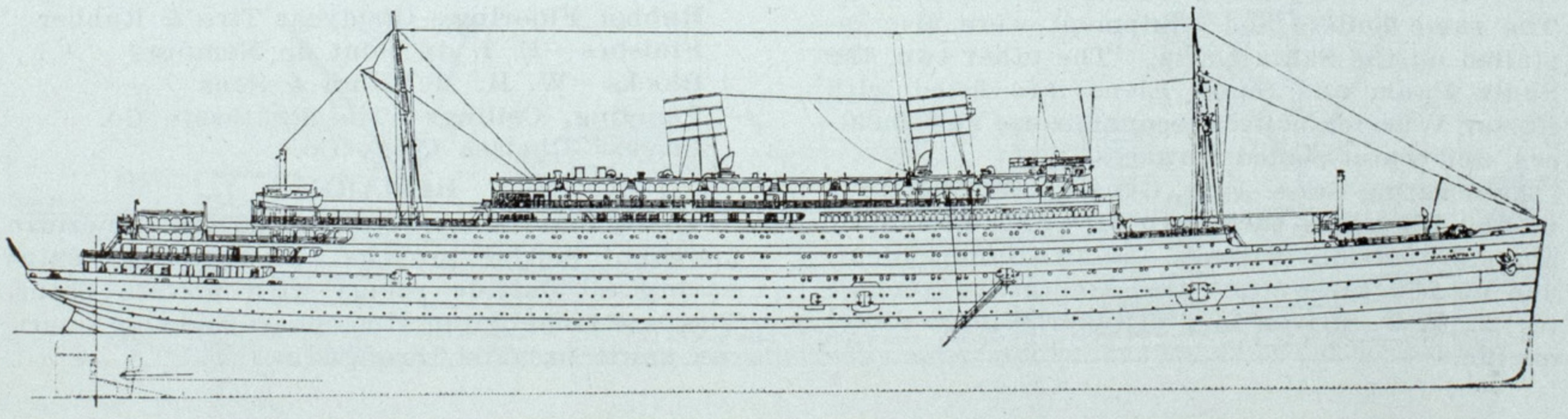
Main Engines—Two sets, triple series, single reduction geared turbines, built by New York Shipbuilding Co. Each set developing 15,000 horsepower, is connected to a propeller shaft through single reduction gears supplied by the Falk Corp. Propeller speed 125 r.p.m.

Boilers—Six, Babcock & Wilcox express type watertube marine boilers with a total heating surface of 63,000 square feet and total superheating surface of 15,042 square feet; 49,242 square feet air heating surface; working pressure, 409 pounds; total temperature of steam, 670 degrees Fahr.; fuel, oil. Superheaters, air heaters, oil burning equipment, feed water regulators, and furnace brick supplied by The Babcock & Wilcox Co. Soot blowers, Diamond.

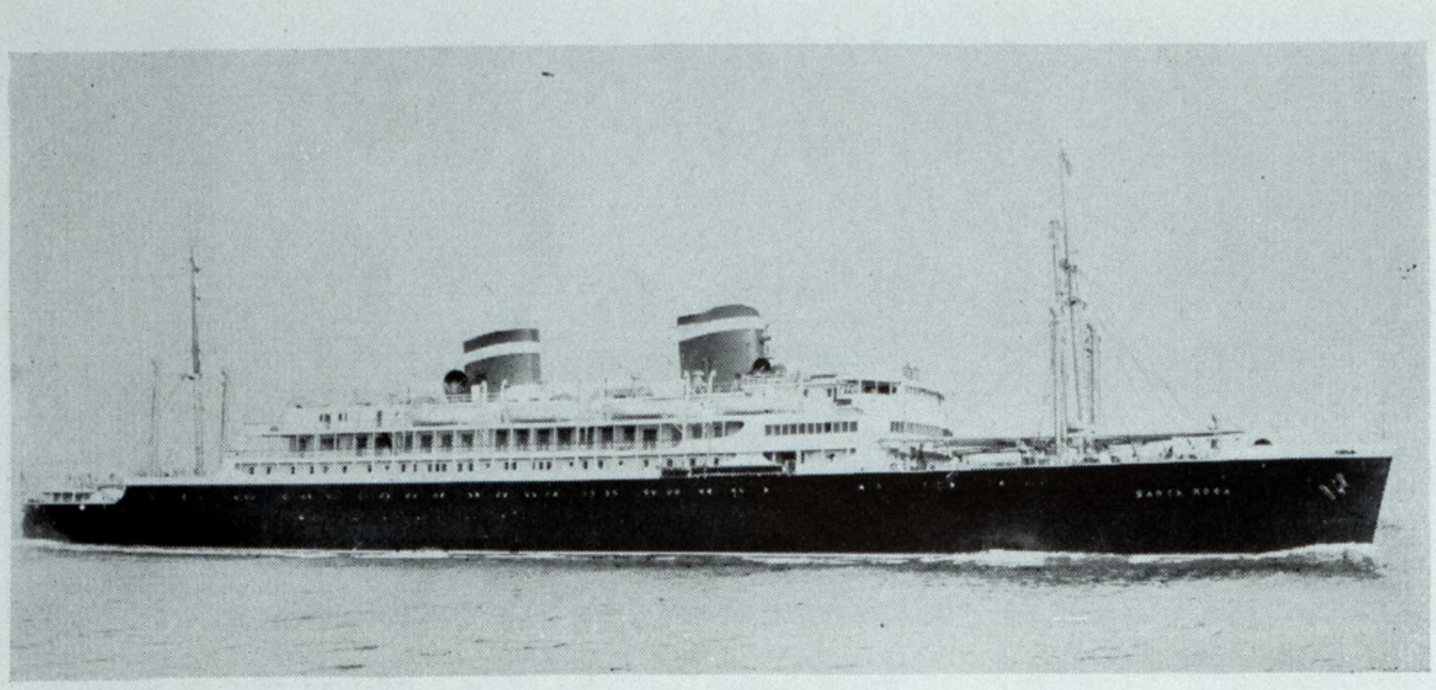
Generating Sets—Four, Westinghouse, turbine driven, each 500 k.w., 240 volt, d.c. One emergency set, 75 k.w., driven by a Superior Engine Co. diesel engine. Also storage batteries, Electric Storage Battery Co.

AUXILIARY EQUIPMENT

Electric Motors—Westinghouse Electric
Pumps—Worthington; Quimby; De Laval
Windlass—Allan Cunningham
Winches—Lidgerwood Mfg. Co.
Steering Gear—American Engineering Co.
Refrigeration—Carrier-Brunswick Int. Inc.
Oil Heaters—Davis Engineering Co.
Thrust Bearings—Kingsbury Machine Works
Propellers—Cramp Brass & Iron Foundries
Windows—Kearfott; Amer. Locomotive Co.
Chain, Cable—Nat'l Mal. Steel Cast. Co.
Anchors—Baldt Anchor Chain & Forge Corp.
Plumbing; Valves—Crane Lunkenheimer
Fan Motors—Diehl Mfg. Co.
Galleys (electric)—Edison G. E. Appliance
Radio Equip.—Mackay Radio Telegraph Co.
Evaporators, Distillers—Griscom-Russell
Combustion Recorders—The Permutit Co.
Oil Purifiers—De Laval Separator Co.
Gyro Compass, Pilot—Sperry Gyroscope Co.
Electric Clocks—Standard Electric Time Co.
Engines (lifeboats)—Standard Motor
Fathometer—Submarine Signal Co.
Lifeboats, Davits—Welin Davit & Boat Corp.
Fire Detecting—Chas. J. Henschel
Rubber Flooring—Goodyear Tire & Rubber
Pipe—Republic Steel Corp.
Condenser Tubes—American Brass Co.
Finishes—E. I. du Pont de Nemours & Co.
Locks—Schlage Lock Co.
Ice Cream Cabinets—Frigidaire Corp.
Fans, Blowers, Turbines—B. F. Sturtevant Co.
W. T. Doors (electric)—Cutler-Hammer
Refrigerators—General Electric Co.



SANTA ROSA—Passenger—Ocean—Twin Screw—Turbine



Name—Santa Rosa
Owner—Grace Line
Builder—Federal Shipbuilding & D. D. Co.
Naval Architect—Gibbs & Cox, Inc.
Launched—Mar. 24, '32; comp., Oct. 27, '32
Sister Ships—Santa Paula, Santa Lucia, and Santa Elena. Launched respectively, June 11, 1932; Oct. 3, 1932; and Nov. 30, 1932. Completed respectively, Dec. 23, 1932; Feb. 6, 1933. Tentative sailing of the Santa Elena scheduled for April, 1933.
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 508 feet; length between perpendiculars, 484 feet; breadth molded, 72 feet; depth molded, 39 feet; draft loaded, 26 feet, 2½ inches; displacement loaded, 16,500 tons; gross tonnage, 11,200; net tonnage, 5813; passenger capacity, first class, 225; third class, 65; cargo capacity, cubic feet, 290,000; speed in service, 18½ knots.

MACHINERY PARTICULARS

Main Engines—Two, double reduction geared, cross compound turbines, designed and built by the General Electric Co. Total horsepower normal, 12,000 at 95 revolutions per minute.

Boilers—Four, Babcock & Wilcox, watertube marine boilers, with a total heating surface of 19,560 square feet, and total superheating surface of 8412 square feet; 8396 square feet of economizer surface; working pressure of 430 pounds; total temperature of steam, 778 degrees Fahr.; fuel, oil. Superheaters, desuperheaters, oil burning equipment, economizers, and furnace brick supplied by the Babcock & Wilcox Co. Soot blowers, Diamond Power Specialty Corp. The same boilers and equipment were also installed on the Santa Lucia. The other two, the Santa Paula and Santa Elena, are fitted with Foster Wheeler boilers, economizers, superheaters, and water-cooled furnaces.

Generating Sets—Five, General Electric; four of 500 kilowatts each, two of which driven by main propulsion turbines and two independent, one of 200 kilowatts. One emergency generator, 20 k. w., driven by 3-cylinder Winton diesel engine.

DESCRIPTION

This vessel and two sister ships are now in service. The fourth will shortly enter service. They operate in the Grace Line's service from New York to the West coast of Central America, Mexico and the United States, also touching British Columbia. In safety, comfort and luxury, they are among the fines ships afloat.

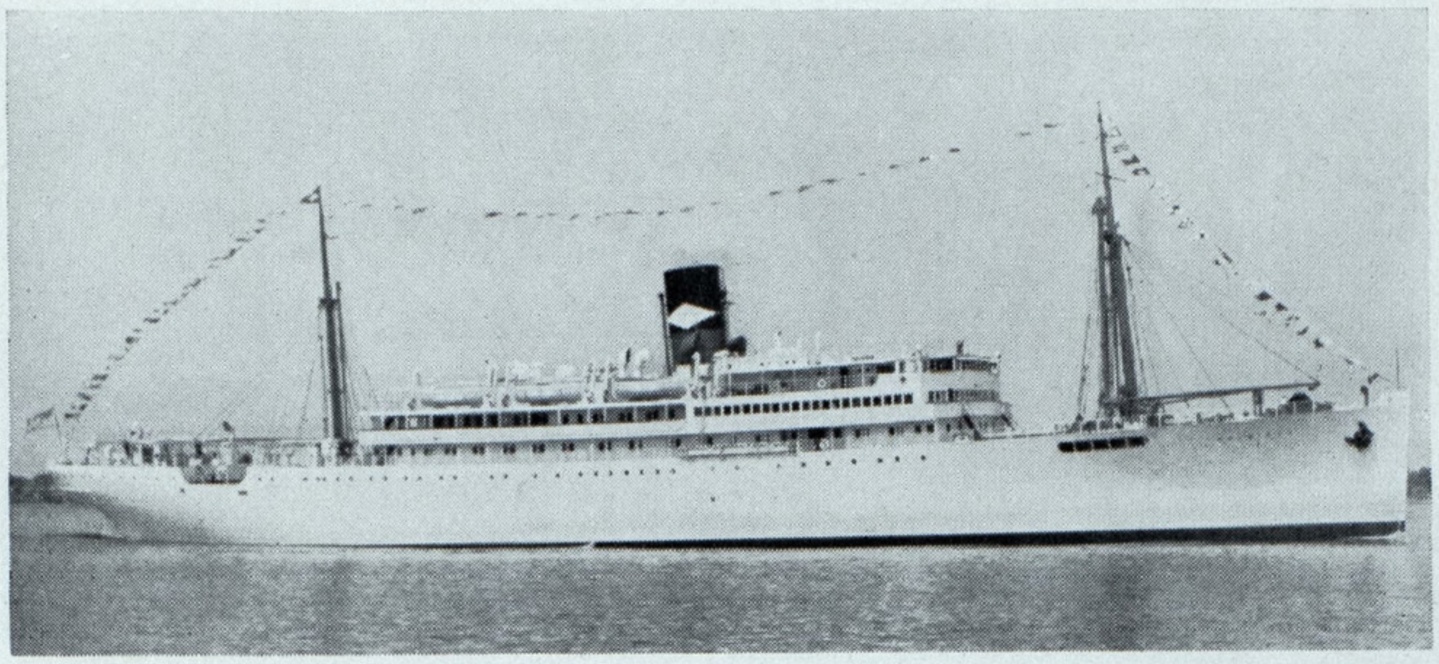
AUXILIARY EQUIPMENT

Pumps—Worthington; Ingersoll-Rand; De-Laval; Northern; Nash; Quimby; Warren
Windlass—Hyde Windlass Co.
Winches—Hyde Windlass Co.
Steering Gear—Hyde Windlass Co.
Telegraph, Telephone—Chas. Cory Corp.
Propellers—Cramp Brass & Iron Foundries
Refrigeration—Carrier-Brunswick
Condensers, Compressors—Ingersoll-Rand
Electric Motors—General Electric Co.
Blower Equip.—American Blower Corp.
Watertight Doors—American Locomotive Co.
Air Ejectors—Ingersoll-Rand
Evaporators, Distillers—Davis Eng. Corp.; also, feed water, and fuel oil heaters
Anchor, Chain—National Malleable
Anchors—Baldt Anchor, Chain & Forge Co.
Valves and Fittings—Crane Co.
Plumbing Fixtures—Crane Co.
Ventilating Fans—Ilg. Electric Vent. Co.
Elevators—Otis Elevator Co.
Oil Purifier—De Laval Separator Co.
Oil Coolers, Water Heater—Alco Products
Galleys—Edison G. E. Appliance Co.
Fire Extinguishers—Walter Kidde & Co.
Combustion Recorders—The Permutit Co.
Radio Equipment—Radiomarine Corp.
Telephone System—Graybar Electric Co.
Gyro Compass, Pilot—Sperry Gyroscope Co.
Lifeboat Engines—Standard Motor Const.
Lifeboats, Davits—Welin Davit & Boat Corp.
Fathometer—Submarine Signal Co.
Revolution Counters — Cummings Mach.
Deck Covering—Selby, Battersby & Co.
Windows—Kearfott Engineering Co. Inc.
Sidelights—American Locomotive Co.
Rubber Flooring—Goodyear Tire & Rubber
Finishes—E. I. du Pont de Nemours
Blocks—W. H. McMillan & Sons
Paneling, Ceilings—The Pantasote Co.
Clocks—Chelsea Clock Co.

REMARKS

These four latest additions to the American merchant marine are the first American ships having all outside rooms with private baths. They are homelike in atmosphere and the American spirit prevails throughout.

ANTIGUA—Passenger—Ocean—Twin Screw—Turbine Electric



DESCRIPTION

One of the fleet of six fast, fruit and passenger, twin screw, electrive drive, steamships, the last of which, the Peten, recently entered service, for the United Fruit Co. A complete description of this vessel and class will be found in the MARINE REVIEW for January and July, 1932. Fuel consumption on trials was .743

Name—Antigua
Owner—United Mail Steamship Co.
Builder—Bethlehem S. B. Corp., Fore River
Naval Architect—Bethlehem S. B. Corp.
Launched—Dec. 12, '31; comp., Apr. 1, '32
Sister Ships—Quirigua, Veragua, (by Bethlehem). Launched respectively, Feb. 6, '32; Apr. 23, '32; completed, respectively, June 4, '32; and Aug. 5, '32. Talamanca, Chiriqui, Peten (at Newport News S. B. & D. D. Co.) Launched respectively, Aug. 15, '31; Nov. 14, '31; Aug. 15, '31. Completed respectively, Dec. 12, '31; Mar. 15, '32; Feb. 24, '33.
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 447 feet, 10 inches; length between perpendiculars, 415 feet; breadth molded, 60 feet; depth molded to upper deck, 34 feet, 9 inches; draft, 24 feet; displacement loaded, 10,928 tons; gross tonnage, 6982; net tonnage, 3178; passenger capacity, first class only, 113; cargo capacity, in cubic feet, 245,800 to inside of insulation, 198,400 cubic feet bale; bunker fuel oil capacity in tons, 1405; speed in service, 17½ knots.

MACHINERY PARTICULARS

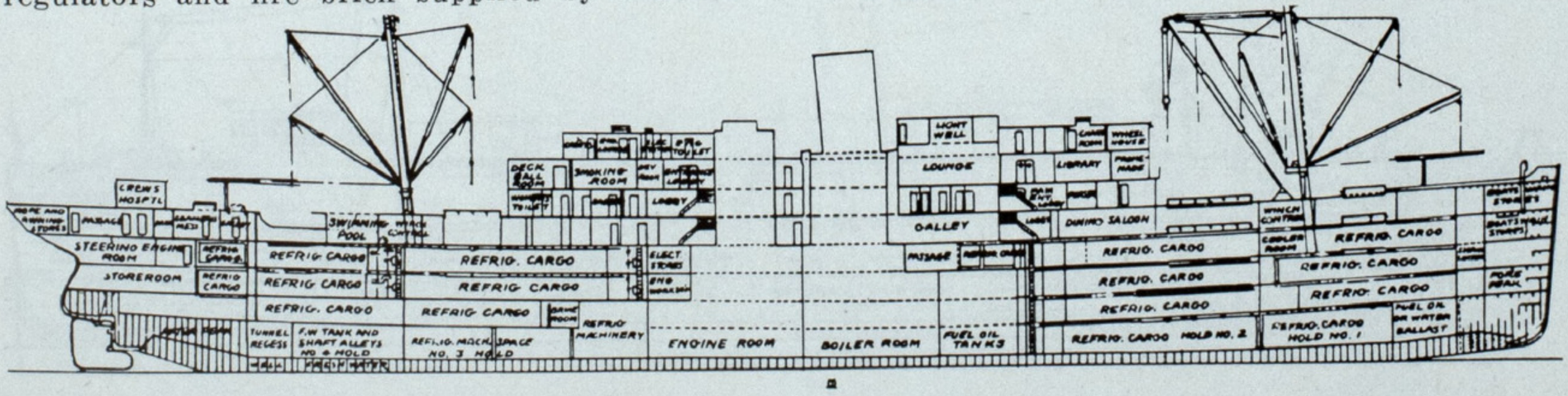
Main Engines—Two, General Electric turbine generating units and two electric motors direct connected to propellers. Total horsepower, 10,500 at 125 revolutions per minute. The generators are alternating current and are each of 4200 kilowatts capacity.

Boilers—Four, Babcock & Wilcox watertube marine boilers with a total heating surface of 22,492 square feet and a total superheating surface of 2248 square feet; working pressure, 350 pounds; superheat 230 degrees Fahr.; fuel, oil. Superheaters, de-superheaters, feed water regulators and fire brick supplied by Babcock & Wilcox Co. Soot blowers, Diamond Power

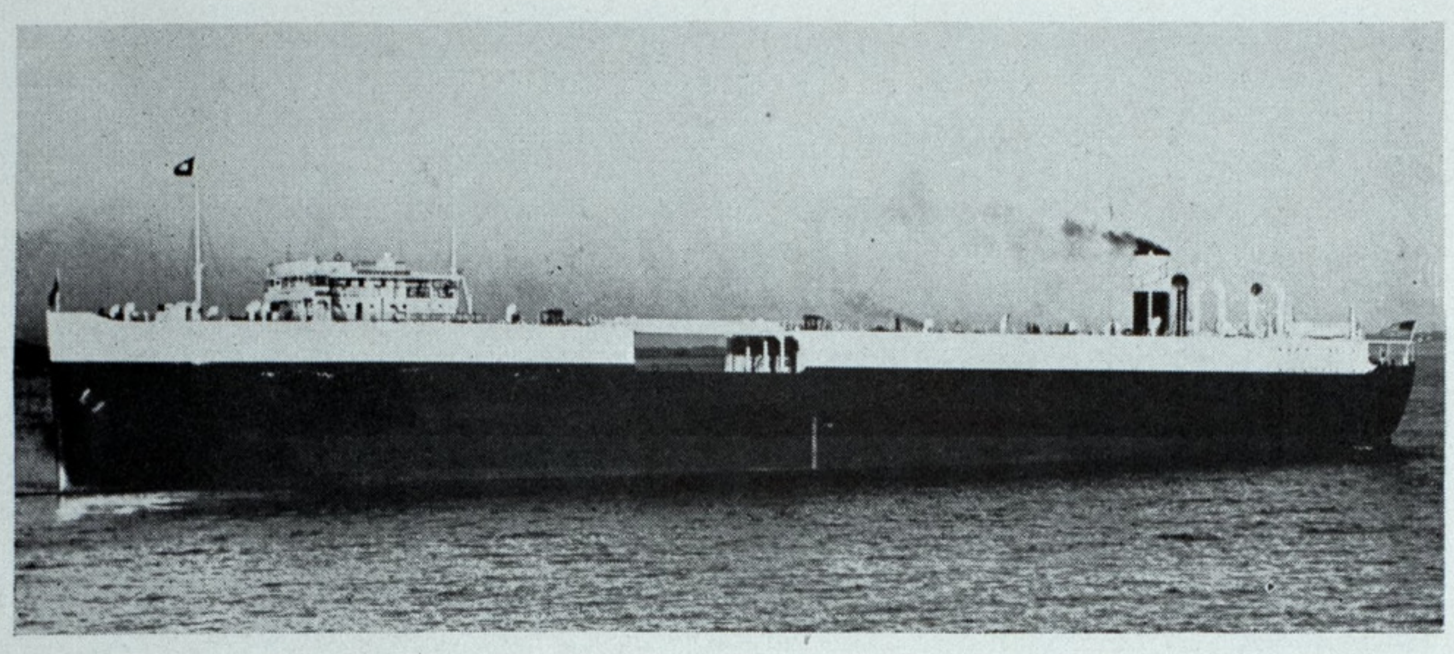
Auxiliary Generators—Three, geared turbine, direct current, General Electric, each 500 k w.

AUXILIARY EQUIPMENT

Pumps—Warren Steam Pump., (principally)
Windlass, Winches—Hyde Windlass Co.
Boat Winches—Lidgerwood Mfg. Co.
Steering Engine, Gypsys—American Eng. Co.
Propellers—Cramp Brass & Iron Foundries
Refrigeration—York; General Electric
Oil Burning Equip.—Todd Shipyards Corp.
Feed Water Heaters—Alco Products Inc.
Blowers—American Blower Corp.
Anchors and Chain—Baldt A. C. & Forge
Galleys—Electric ranges, etc., Edison G. E. Appliance Co.; The Cleveland Range Co.
Plumbing Fixtures—Crane Co.
Valves, Fittings—Crane Co.; Lunkenheimer
Thrust Bearings—Kingsbury Machine Works
Fire Extinguishers—Walter Kidde & Co.
Emergency Lighting—Kohler Co.
Storage Batteries—Edison Stor. Bat. Co.
Lubricating Oil Coolers—Griscom-Russell
Combustion Recorders—The Permutit Co.
Radio Telegraph—Radiomarine Corp.
Gyro Compass, Pilot—Sperry Gyroscope Co.
Fathometer—Submarine Signal Co.
Evaporators, Distillers—Davis Engineering
Deck Covering—Selby, Battersby & Co.
W. T. Doors (electric)—Cutler-Hammer
Turbines (pump drive)—Kearfott Eng. Co.
Oil Purifiers—De Laval Separator Co.
Revolution Counters—Cummings Mach. Wks.
Electric Motors—General Electric Co.
Fire Detecting—Chas. J. Henschel & Co.
Telegraphs, Telephones—Chas. J. Henschel
Clocks—Chelsea Clock Co. (partly)
Windows—Kearfott Engineering Co.
Finishes—E. I. du Pont de Nemours & Co.



SEATRAIN NEW YORK—Cargo—Ocean—Single Screw—Turbine



Name—SEATRAIN NEW YORK
Owner—Seatrain Lines Inc.
Builder—Sun Shipbuilding & Dry Dock Co.
Naval Architect—Sun Shipbuilding & D. D. Co.
Launched—Sept. 14, '32; completed, Sept. 28
Sister Ship—SEATRAIN HAVANA; launched Sept. 26, 1932; completed, Oct. 5, 1932
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 478 feet; length between perpendiculars, 468 feet 6 inches; breadth molded, 63 feet 6 inches; depth molded, 38 feet 3 inches; draft, 22 feet 8 inches; displacement loaded, 16,480 tons; gross tonnage, 8061.84; net tonnage, 4927; cargo capacity, 100 loaded freight cars; bunker fuel oil capacity in tons, 1391; speed, 16½ knots.

MACHINERY PARTICULARS

Main Engine—One, double reduction geared, cross compound turbine built by De Laval Steam Turbine Co. This unit, consisting of a high pressure and low pressure turbine, is designed to operate either with steam at 285 pounds pressure and 650 degrees Fahr. superheat, developing 8000 horsepower at 105 revolutions per minute at the propeller, for a ship's speed of 16½ knots, or with steam at 400 pounds pressure and developing 8800 shaft horsepower at 110 revolutions per minute, giving a speed of 17 knots.

Boilers—Three, Babcock & Wilcox watertube marine boilers with a total heating surface of 16,692 square feet and 3132 square feet of superheating surface; working pressure, 420 pounds per square inch; total temperature of steam, 700 degrees Fahr., fuel, oil. Superheaters, desuperheaters, oil burning equipment, and furnace brick supplied by The Babcock & Wilcox Co. Soot blowers—Diamond.

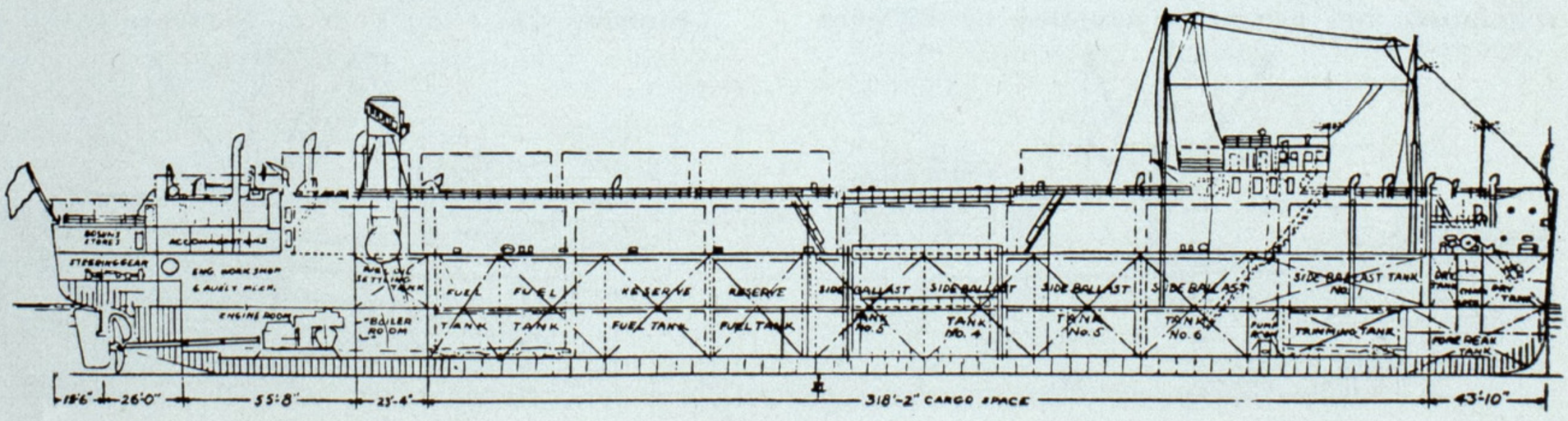
Generating Sets—Two, General Electric, turbine driven generators of 250 k.v.a. alternating current, three phase, 60-cycle, 220-volt. Current for lighting supplied by three 10 k.v.a., 220 to 110-volt, single phase, transformers.

DESCRIPTION

This vessel and sister ship, SEATRAIN HAVANA, each can carry 100 loaded freight cars, equivalent to a mile-long train. They are not of the carferry type, but are large, well-proportioned vessels, having somewhat the appearance of tankers. Railroad cars are lifted from the shore rails and placed aboard the ship.

AUXILIARY EQUIPMENT

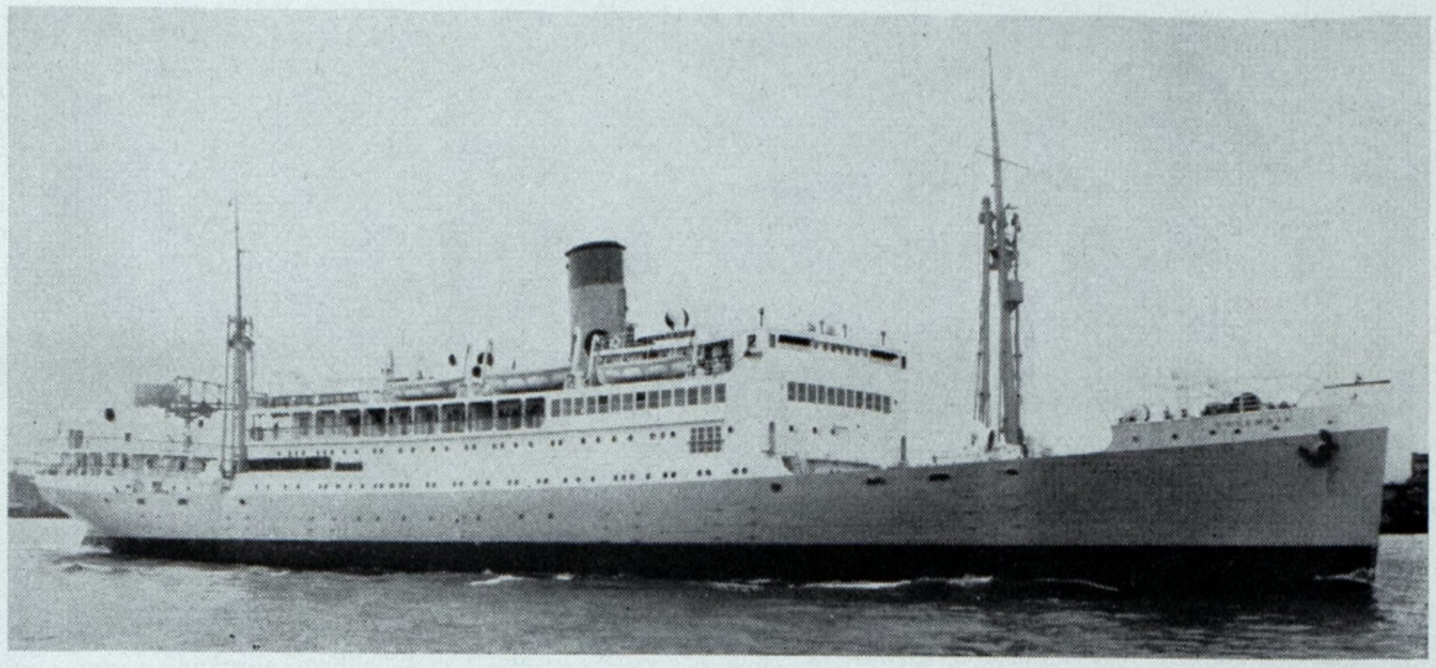
Pumps—Worthington; Nash; Goulds; Quimby; Ingersoll-Rand; Waterous
Windlass—American Engineering Co.
Winches, Gypsys—American Engineering Co.
Steering Gear—American Engineering Co.
Propellers—Cramp Brass & Iron Foundries
Refrigeration—Carrier-Brunswick Int. Inc.
Anchors, Chain—Baldt A. C. & Forge Co.
Thrust Bearings—Kingsbury Mach. Works
Valves and Fittings—Crane Co.
Electric Motors—Diehl; General Electric
Condensers—Foster Wheeler Corp.
Radio Equipment—Radiomarine Corp.
Oil Purifier—Sharples Specialty Co.
Fathometer—Submarine Signal Co.
Turbines (pump drive)—B. F. Sturtevant
Engine (compressor)—Troy Eng. & Mach.
Galley Equipment—Elisha Webb
Floats—Welin Davit & Boat Corp.
Telegraphs, Telephones—Chas. J. Henschel
Oil Coolers—Davis Engineering Co.
Feed Water Heater—Davis Engineering Co.
Fuel Oil Strainers—Coen Co.
Finishes—E. I. du Pont de Nemours & Co.
Pipe (iron)—Republic Steel Corp.
Controls (electrical)—Cutler-Hammer



COLOMBIA—Passenger—Ocean—Single Screw—Turbine

DESCRIPTION

This vessel and sister ship, HAITI, built in 1932 for service from New York to Haiti and Colombia, South America, are the "biggest little ships afloat." Every modern device for safety, convenience, pleasure and comfort, from swimming pool to condition of air, is provided for their 134 first class passengers.



Name—COLOMBIA
Owner—Colombian Steamship Co.
Builder—Newport News S. B. & D. D. Co.
Naval Architect—Theodore E. Ferris
Launched—Aug. 6, '32; **comp.**, Nov. 17, '32
Sister Ship—HAITI; launched, Sept. 17, 1932; completed, Dec. 15, 1932
Classification—American Bureau of Shipping

HULL PARTICULARS

Length over all, 404 feet 5 inches; length between perpendiculars, 385 feet; breadth molded, 57 feet 6 inches; depth molded, to upper deck, 31 feet 6 inches; draft (designed load), 23 feet 6 inches; displacement loaded, 9490 (designed); gross tonnage, 5236.19; net tonnage, 3042; passenger capacity, first class, 134; second class, 24; cargo capacity, in cubic feet, 320,470; bunker fuel oil capacity, in tons, 591; speed, 18 knots.

MACHINERY PARTICULARS

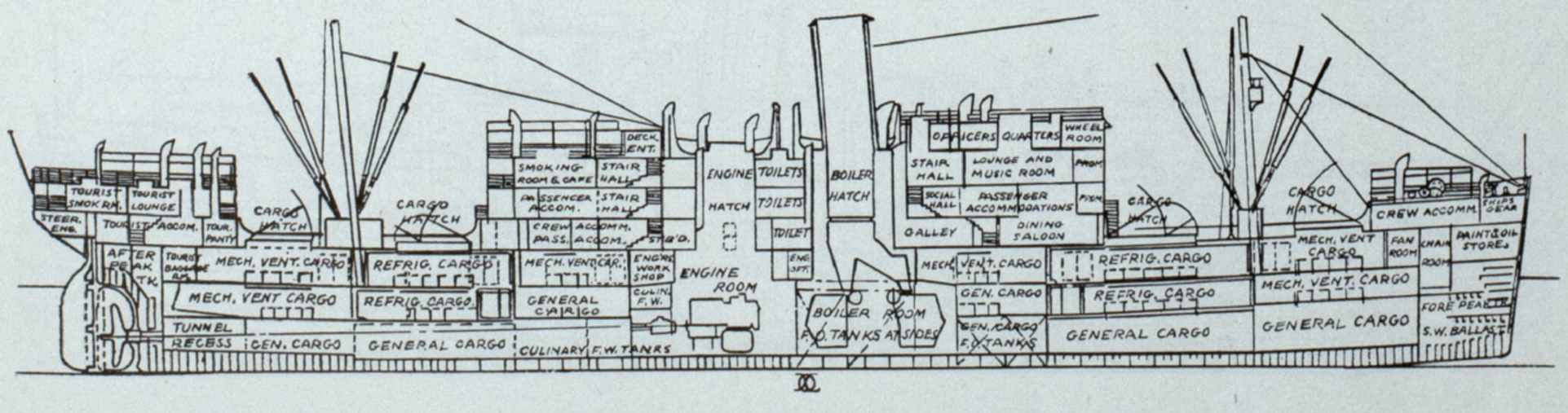
Main Engine—One set, single reduction, geared impulse type turbines, by Newport News Shipbuilding & Dry Dock Co. The turbines operate at 1800 revolutions per minute and develop 6500 to 7500 shaft horsepower at 105 to 109 revolutions per minute of the propeller.

Boilers—Four, Babcock & Wilcox, watertube marine boilers with a total heating surface of 17,780 square feet and 2080 square feet of superheating surface; working pressure, 410 pounds; total temperature of steam, 690 degrees Fahr.; fuel, oil. Superheaters, desuperheaters, feed water regulators, and furnace brick, supplied by The Babcock & Wilcox Co. Soot blowers, Diamond Power Specialty Corp.

Generating Sets — Three, Turbine geared drive, General Electric, 250 k.w., 240 volt, direct current. Also, one 20 k.w., 120-volt gasoline engine driven generator. Storage batteries (60 cells), Electric Storage Battery Co.

AUXILIARY EQUIPMENT

Pumps—Worthington Pump & Mach. Corp.
Windlass—American Engineering Co.
Winches—Newport News S. B. & D. D. Co.
Steering Gear—American Engineering Co.
Propellers—Newport News S. B. & D. D. Co.
Refrigeration—Carrier-Brunswick
Oil Burning Equip.—Todd Shipyards Corp.
Blowers—Sturtevant, Amer. Blower
Anchors; Chain—Baldt Anchor C. & F. Corp.
Valves & Fittings—Crane Co.
Hardware—Dayton Mfg. Co.
Electric Motors—General Electric Co.
Fans—Diehl Mfg. Co.
Fire Extinguishers—Walter Kidde & Co.
Radio Equipment—Radiomarine Corp.
Oil Purifier—Sharples Specialty Co.
Gyro Compass—Sperry Gyroscope Co.
Fathometer—Submarine Signal Co.
Lifeboats, Davits—Welin Davit & Boat Corp.
Windows—Kearfott Engineering Co.
Clocks—Chelsea Clock Co.
Telegraphs—Chas. J. Henschel & Co.
Thrust Bearings—Kingsbury Machine Works
Turbines (Feed Pumps)—B. F. Sturtevant
Telephone System—Holtzer Cabot
Fire Alarm System—Garrison
Galleys—Westinghouse; Cleveland Range
Torsionmeters—Alexander McNab
Blocks—W. H. McMillan & Son
Deck Covering—Selby, Battersby & Co.



ESCANABA—Coast Guard Cutter—Single Screw—Turbine

Name—ESCANABA
Owner—United States Coast Guard
Builder—Defoe Boat and Motor Works
Naval Architect—United States Coast Guard
Launched—Sept. 17, '32; Comp., Nov. 17, '32
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 165 feet; length between perpendiculars, 150 feet; breadth molded, 36 feet; depth molded, 21 feet; draft designed, mean, 12 feet; maximum 13 feet; displacement loaded, designed, 960 tons; complement, 5 officers, 46 men; bunker fuel oil capacity, in tons, 150; speed, 13¼ knots, or 15¼ statute miles.

MACHINERY PARTICULARS

Main engine—One, steam turbine double reduction geared unit, built by De Laval Steam Turbine Co. Size, 1500 shaft horsepower at 140 revolutions per minute of the propeller. The turbine operates on steam at 340 pounds pressure and 200 degrees Fahr. superheat, with 27½-inch vacuum.

Boilers—Two, watertube marine boilers with inter-deck superheater, built, by Babcock & Wilcox Co. Size, 2463 square feet of heating surface in each boiler, operating at 340 pounds per square inch working pressure and with 200 degrees of superheat; superheating surface for each boiler is 222 square feet. The boiler tubes are 2 inches in diameter; oil burning equipment, Babcock & Wilcox, as are also desuperheaters and feed water regulators. Soot blowers, Diamond Power Specialty Corp.

Auxiliary Generators—Two, turbine driven, De Laval generating units, each of 35-kilowatt capacity. Electrical end, Star Electric Motor Co.

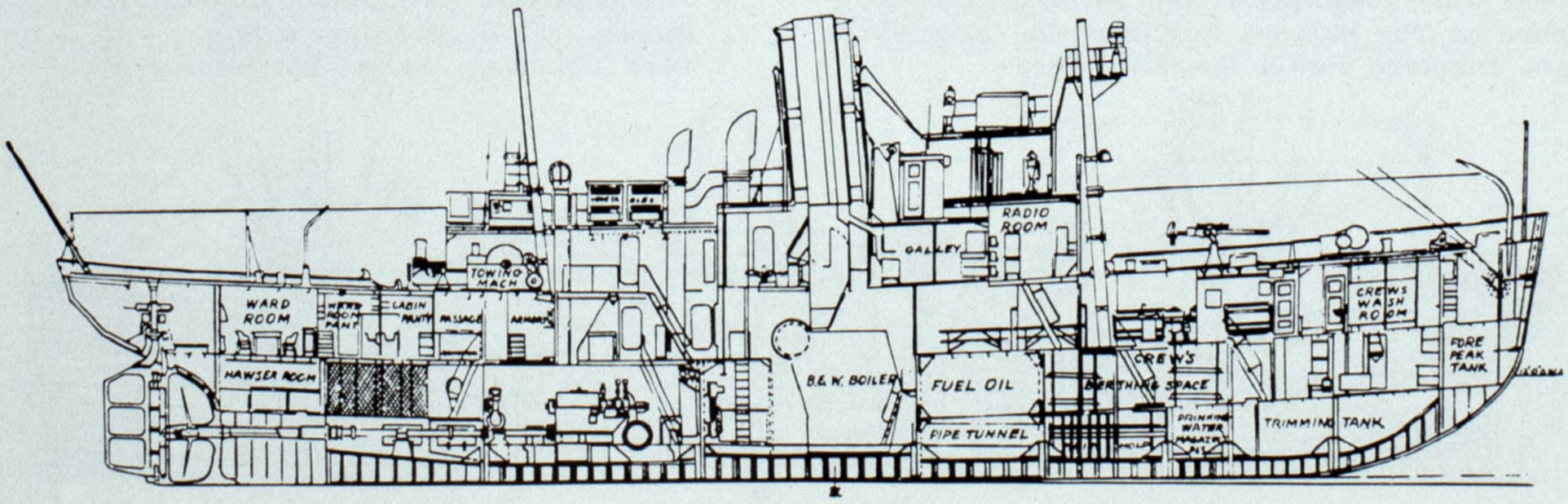
AUXILIARY EQUIPMENT

Condensers—Two, Foster Wheeler Corp.
Pumps—Warren; De Laval; Northern
Windlass—Lidgerwood Mfg. Co.
Towing Machine—Lidgerwood Mfg. Co.
Steering Engine—Lidgerwood Mfg. Co.
Propeller—F. Ferguson and Son
Refrigeration—Kelvinator; Westinghouse
Plumbing Fixtures—Crane Co.
Valves and Fittings—Crane Co.
Electric Motors—Electro Dynamic Co.
Stern Bearings—Rubber, B. F. Goodrich Co.
Gyro Compass—Sperry Gyroscope Co.
Revolution Counters—Cummings Mach. Wks.
Fathometer—Submarine Signal Co.
Floats—Welin Davit & Boat Corp.

REMARKS

Fan, Blowers—B. F. Sturtevant Co.
Thrust Bearings—Kingsbury Machine Works
Feed Water Heater—Also evaporator, distiller; Davis Engineering Corp.
Controls (electrical)—Cutler-Hammer
Turbines (pump drive)—Kearfott Eng. Co.
Windows—Kearfott Engineering Co.
Oil Purifiers—De Laval Separator Co.

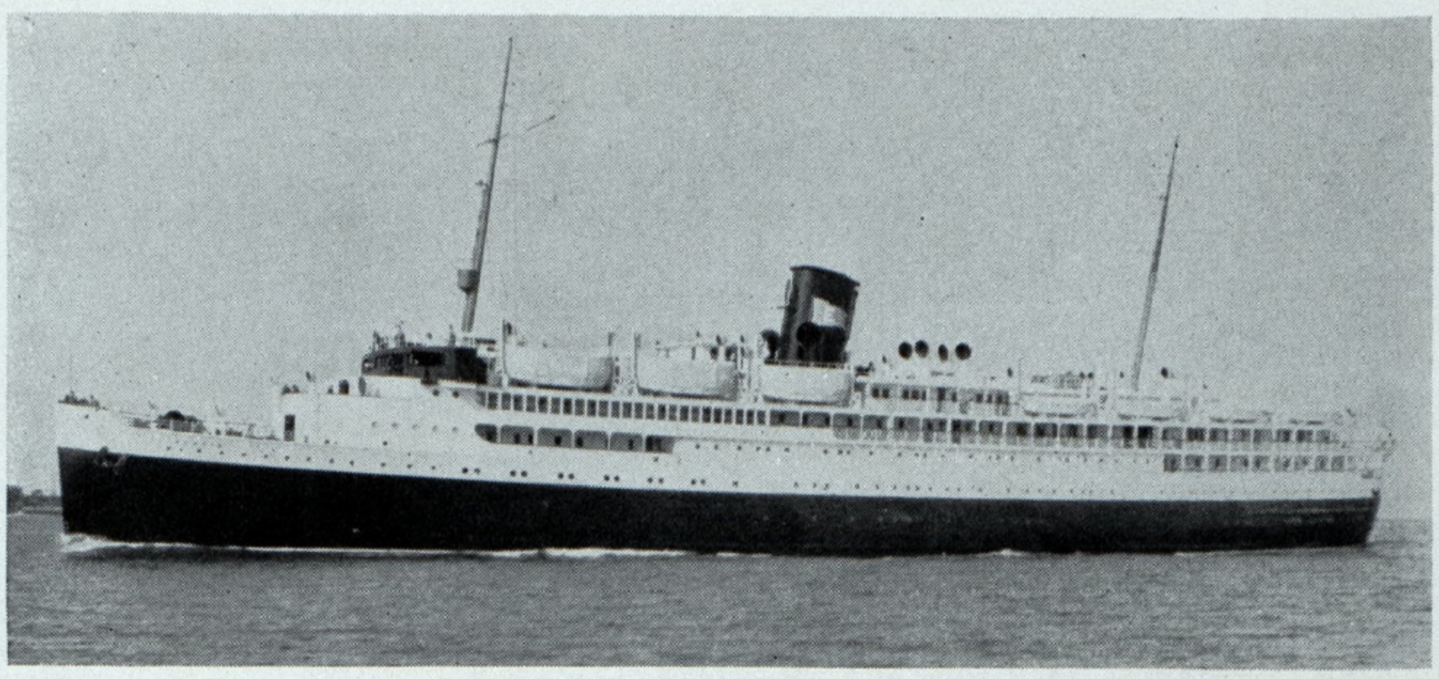
An illustrated article including results of standardization trials in January MARINE REVIEW.



ACADIA—Passenger—Ocean—Twin Screw—Turbine

DESCRIPTION

This vessel and sister ship, SAINT JOHN, delivered in 1932, are fast, twin screw passenger and freight ships for the Eastern Steamship Co.'s service to Nova Scotia from Boston and New York. They are modern in every detail. See MARINE REVIEW of June, 1932, for full description and illustrations. The ships are of the flush deck type.



Name—ACADIA
Owner—Eastern Steamship Co.
Builder—Newport News S. B. & D. D. Co.
Naval Architect—Theodore E. Ferris
Launched—Feb. 13, '32; comp., June 7, '32
Sister Ship—SAINT JOHN. Launched, Jan. 9, 1932; completed, April 22, 1932
Classification—American Bureau of Shipping

HULL PARTICULARS

Length overall, 402 feet 11 inches; length between perpendiculars, 387 feet; breadth molded, 61 feet; depth molded, to upper deck, 29 feet 9 inches; draft, 18 feet; displacement loaded (designed), 6811; gross tonnage, 6185.46; net tonnage, 3020; passenger capacity, first class, 657; second class (berth travel), 87; cargo capacity, in cubic feet, 163,500; bunker fuel oil capacity in tons, 659; speed, 20 to 22 knots.

MACHINERY PARTICULARS

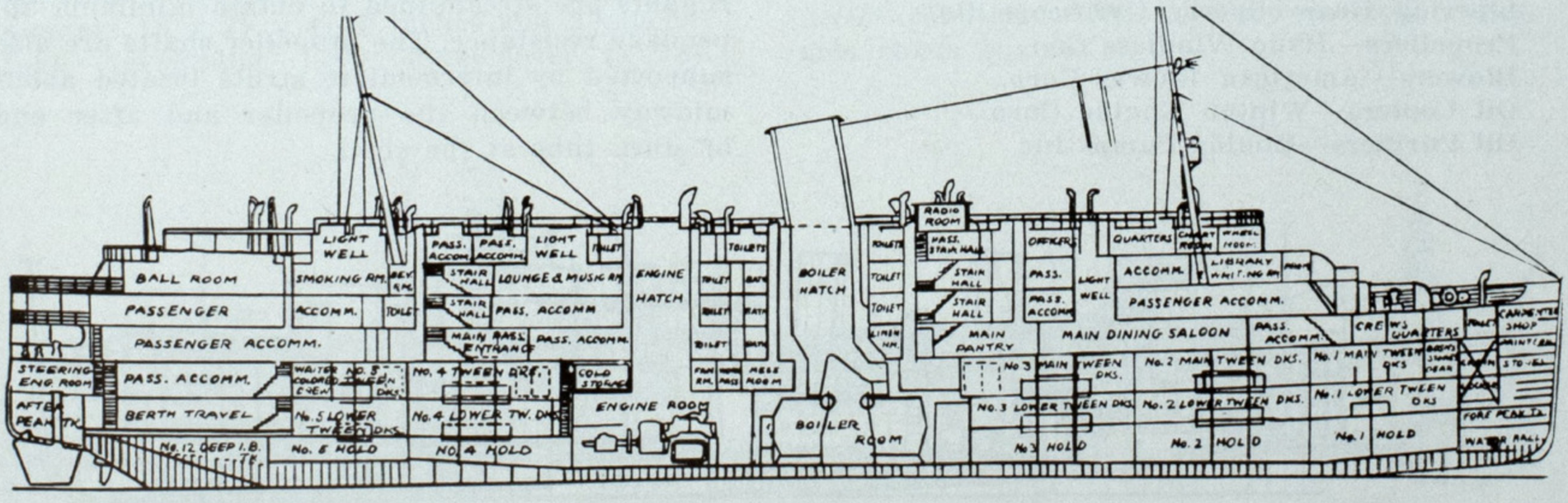
Main Engines—Two sets, single reduction geared, impulse type, compound turbines, by Newport News Shipbuilding & Dry Dock Co. The turbines operate at 1800 revolutions per minute and develop a total of 9500 to 11,400 shaft horsepower at 168 to 178 revolutions per minute of the propeller shaft.

Boilers—Four, Babcock & Wilcox, watertube, marine boilers with a total heating surface of 29,136 square feet and 3132 square feet of superheating surface; working pressure, 390 pounds; superheat, 210 degrees Fahr.; fuel, oil. Superheaters, desuperheaters, feed water regulators and furnace brick, supplied by the Babcock & Wilcox Co. Soot blowers, Diamond Power Specialty Corp. Oil burning equipment, Todd Shipyards Corp.

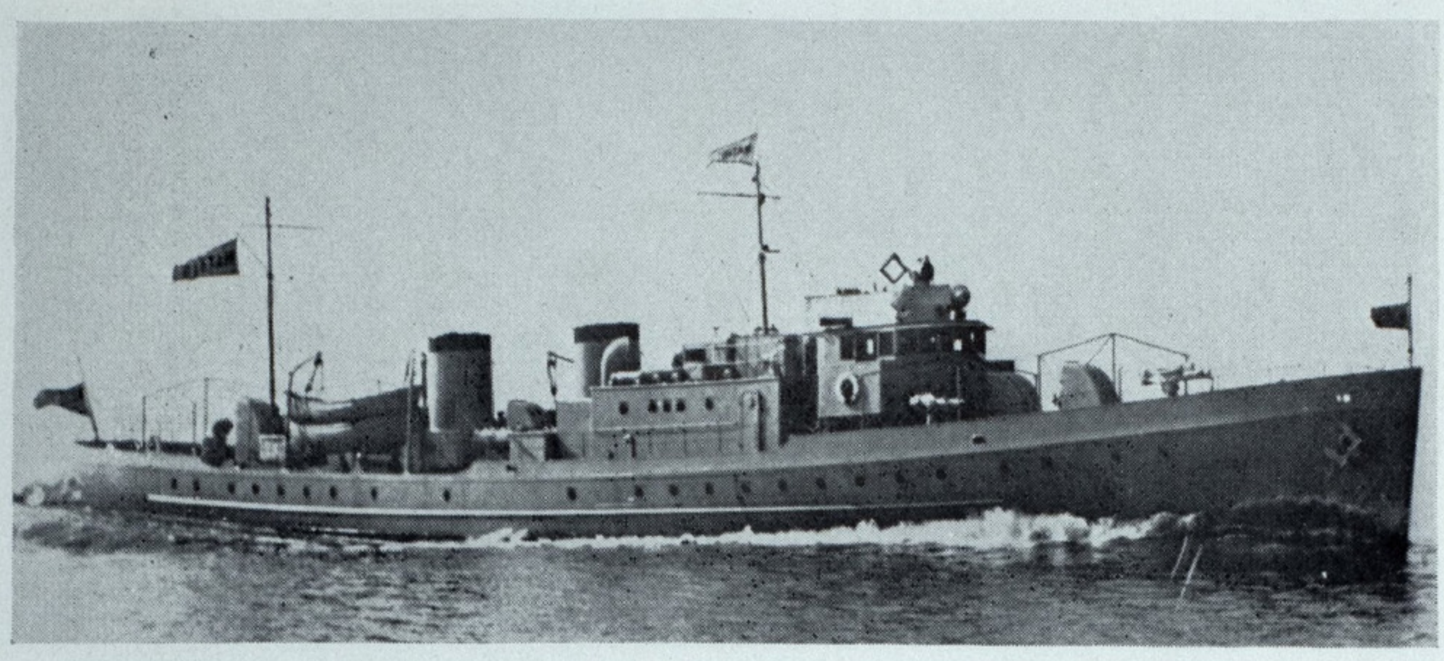
Generating Sets—Three, turbine, General Electric, 250 k.w. each. Also, one 20 k.w., 120-volt, gasoline engine driven generator. Storage batteries, Electric Storage Battery Co.

AUXILIARY EQUIPMENT

Pumps—Worthington Pump & Mach. Corp.
Windlass—Hyde Windlass Co.
Cargo Elevators—Newport News S. B. Co.
Steering Gear—Hyde Windlass Co.
Propellers—Newport News S. B. & D. D. Co.
Refrigeration—Carrier-Brunswick
Thrust Bearings—Kingsbury Mach. Works
Anchor Chain—National Malleable
Telegraphs—Chas. J. Henschel & Co.
Motors—Westinghouse, General Electric
Fans (Staterooms)—Westinghouse
Blowers—B. F. Sturtevant Co.
Compressors—Ingersoll-Rand Co.
Oil Purifier—Sharples Specialty Corp.
Anchors—Baldt Anchor, Chain & Forge Corp.
Marine Hardware—Dayton Mfg. Co.
Fire Extinguishers—Walter Kidde & Co.
Combustion Recorders—The Permutit Co.
Radio Equipment—Radiomarine Corp.
Gyro Compass, Pilot—Sperry Gyroscope Co.
Fathometer—Submarine Signal Co.
Lifeboats, Davits—Welin Davit & Boat Corp.
Windows—Kearfott Engineering Co. Inc.
Paneling—Haskelite; Pantasote
Locks—Schlage Lock Co.
Clocks—Chelsea Clock Co.
Deck Covering—Selby, Battersby Co.



GALATEA—Coast Guard Patrol—Twin Screw—Diesel



Name—GALATEA, sistership ARGO
Owner—United States Coast Guard
Builder—John H. Mathis Co.
Naval Architect—United States Coast Guard
Launched—Dec. 10, '32; comp. Feb. 6, '33
Sister Ship—ARGO, launched Nov. 12, 1932; completed Jan. 4, 1933
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 165 feet; length between perpendiculars, 160 feet; breadth molded, at load waterline 24 feet, 1 inch, at deck, 25 feet, 3¾ inches; depth molded, 13 feet, 2½ inches; draft, mean, 7 feet, 6 inches, maximum, 9 feet; displacement loaded, 334 tons; bunker diesel fuel capacity, in tons, 26.7; cruising radius, about 2500 miles; speed, 16½ knots.

MACHINERY PARTICULARS

Main Engines—Two, 6-cylinder, 4-cycle, solid injection, reversing, diesel engines, built by the Winton Engine Corp. Size, 14-inch bore, 16-inch stroke; 670 brake horsepower each at 450 revolutions per minute.

Auxiliary Power—Three, 15-kilowatt, Westinghouse generators, each direct connected to a 3-cylinder, 5 x 7 inches, airless injection, Winton diesel engine, turning at 600 revolutions per minute. One emergency 5-kilowatt generating set driven by a gasoline engine, furnished by Kohler Co.

AUXILIARY EQUIPMENT

Pumps—Warren; Gould; Winton
Air Compressors—Kellogg; Ingersoll-Rand
Windlass—Hyde Windlass Co.
Steering Gear—Sperry Gyroscope Co.
Propellers—Hyde Windlass Co.
Blowers—American Blower Corp.
Oil Coolers—Winton Engine Corp.
Oil Purifiers—Goulds Pumps Inc.
Whistle—Allan Cunningham
Plumbing Fixtures—Crane Co.
Valves and Fittings—Crane Co.
Heating Boiler—American Radiator Co.
Radiators—Rome Radiation Co.
Refrigeration—Westinghouse El. & Mfg. Co.
Anchor, Chain—Baldt Anchor, Chain & Forge
Searchlights—Sperry Gyroscope Co.
Windows—Ternstedt Mfg. Co.
Galley Range—Ingle Mfg. Co.
Marine Hardware—H. S. Getty & Co. Inc.
Electric Motors—Diehl Mfg. Co.
Stern Bearings—Rubber, B. F. Goodrich Co.
Thrust Bearings—Kingsbury Machine Works
Davits—John H. Mathis Co.
Floor Plates—Central Iron & Steel Co.
Fuel Oil Strainers—Coen Co.
Batteries—Electric Storage Battery Co.
Floats—Welin Davit & Boat Corp.

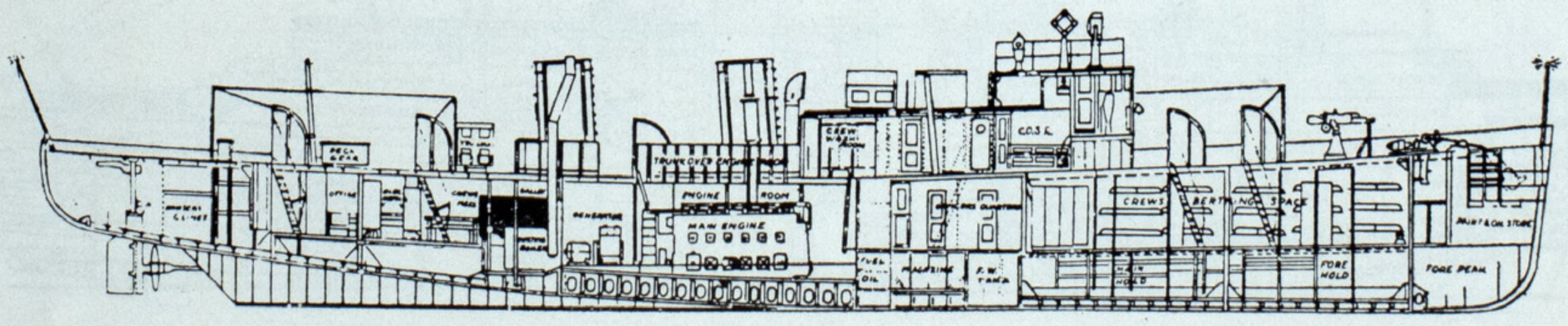
DESCRIPTION

For off-shore patrol duty, the GALATEA and sister vessel ARGO, are not unlike the THETIS and class, patrol boats, described last year. One distinctive difference in outward appearance is two stacks instead of one. The propelling power consists of two diesel engines, each direct connected to a propeller.

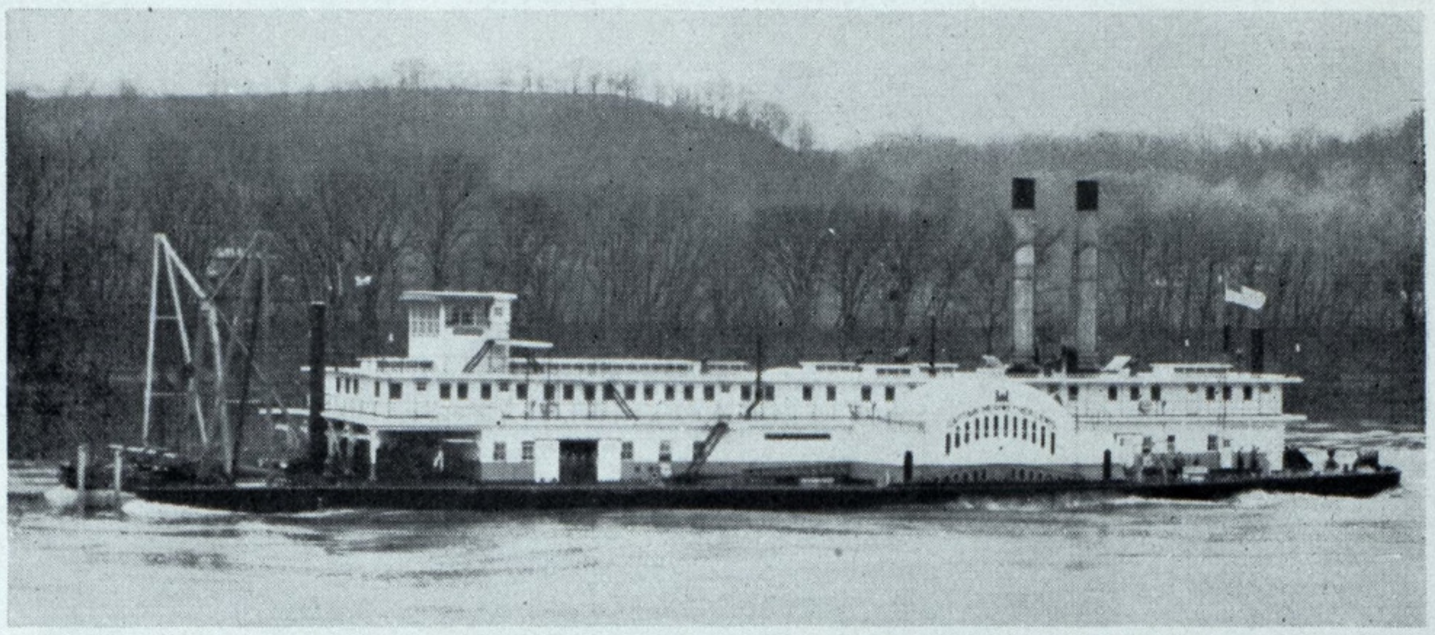
REMARKS

Among the notable features of the GALATEA and ARGO is the unique arrangement of the twin rudders and combination stern frames and shaft struts. A short stub shaft projects aft of the propeller and is carried in a cutless rubber bearing fitted in a boss on the forward side of the stern frame.

In this way eddy losses due to the presence of the customary strut just forward of the propeller have been eliminated. Furthermore, the rudders are streamlined to obtain minimum appendage resistance. The propeller shafts are also supported by intermediate struts located about midway between the propeller and after end of stern tube at the shell.



CAPT. MERIWETHER LEWIS—Dredge—Rivers—Sidewheel—Steam



DESCRIPTION

This dredge and sister vessel, CAPT. WILLIAM CLARK, are among the largest dredging units on our entire river system. They are suction dredges and are of substantial steel construction. Side wheels are used for propulsion. The propelling engines are of tandem compound, poppet valve reciprocating type.

Name—CAPT. MERIWETHER LEWIS
Owner—United States Engineers
Builder—Marietta Mfg. Co.
Naval Architect—United States Engineers
Launched—Dec. 12, '31; comp., Apr. 25, '32
Sister Vessel—CAPT. WILLIAM CLARK. Launched, Jan. 8, 1932; completed, June 5, 1932
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 268 feet 11½ inches; length between perpendiculars, 260 feet, breadth over all, 84 feet 8⅜ inches; breadth molded, 50 feet; depth molded, 8 feet 6 inches; draft, 4 feet; displacement loaded, 1355 long tons; gross tonnage, 2370; number in crew, 60; bunker fuel oil capacity in tons, 160; speed, 10 statute miles per hour.

MACHINERY PARTICULARS

Main Engines—Two, tandem compound, reciprocating steam engines; cylinder diameters, 20 and 40 inches; stroke, 84 inches; total horsepower at 17 r. p. m., 1500. Built by Marietta Mfg. Co.

Boilers—Two, Foster Wheeler, cross drum watertube marine boilers, with a total of 9000 square feet heating surface; operating at 250 pounds per square inch and able to generate 45,000 pounds of steam per hour; fuel, oil. Oil burning equipment, Ray Burner Co. Soot blowers, Diamond Power Specialty Corp.

Dredge Pump Engine—One, impeller type dredge pump of 34-inch suction, 34-inch discharge and 82-inch impeller, supplied by Hardie-Tynes Mfg. Co. This pump is driven by a vertical, triple expansion steam engine of cylinder diameters 18 x 29 x 47½ inches and 20 inches stroke, developing 1200 horsepower at 160 r.p.m.; designed and built by American Ship Building Co.

Generator Sets—Two, Troy Engine & Machine Co., direct current, marine generating sets; one of 15-kilowatt and one of 20-kilowatt capacity.

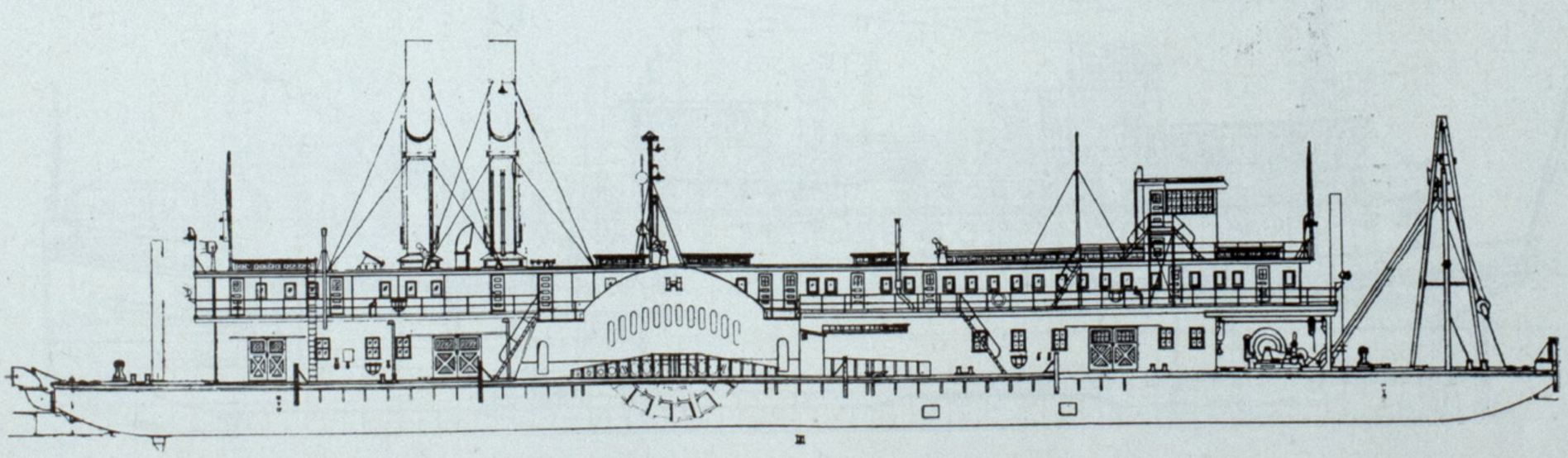
AUXILIARY EQUIPMENT

Pumps—Union; Worthington; Elliott
Capstans—American Engineering Co.
Spud Winches—American Engineering Co.
Winches—American Hoist & Derrick Co.
Steering Gear—Marietta Mfg. Co.
Refrigeration—Vilter Mfg. Co.
Condenser—Foster Wheeler; C. H. Wheeler
Valves and Fittings—Crane Co.
Marine Hardware—The Dayton Mfg. Co.
Evaporators—Griscom-Russell Co.
Feed Water Heaters—Griscom-Russell Co.
Feed Water Filters—Griscom-Russell Co.
Galley Equipment—Elisha Webb & Son
Thrust Bearings—Kingsbury Machine Works
Electric Refrigerator—Frigidaire Corp.

REMARKS

All of the hull and the framing of the upper works is of steel construction while the deck house, cabin and pilot house are finished in wood.

Several unique features characterize the CAPT. MERIWETHER LEWIS and sister vessel CAPT. WILLIAM CLARK. Propulsion is by means of side wheels rather than by the more usual method of stern-wheel or propellers in tunnels. The propelling engines are of the horizontal tandem compound type. Another unique feature is the driving of the massive large capacity dredging pump by direct connected 1200 horsepower triple expansion steam engine.



HICKORY—Lighthouse Tender—Bays—Single Screw—Steam

Name—HICKORY
Owner—United States Lighthouse Service
Builder—Bath Iron Works Corp.
Naval Architect—U. S. Lighthouse Service
Launched—Feb. 9, '33; comp. March 1933
Classification—Lighthouse Service

HULL PARTICULARS

Length over all, 131 feet, 4 inches; length between perpendiculars, 121 feet, 4 inches; breadth molded, 24 feet, 6 inches; depth molded, 11 feet, 9 inches; draft, 8 feet, 6 inches; displacement loaded, 400 tons; cargo capacity, 90 tons; bunker fuel oil capacity, in gallons, 16,700; speed, at sea, 11 knots.

MACHINERY PARTICULARS

Main Engine—One, triple expansion reciprocating steam engine of 500 indicated horsepower at 160 revolutions per minute, built by Bath Iron Works Corp. Size of engine, 11½ x 19 x 32 inches by 24 inches stroke.

Boiler—One, Babcock & Wilcox watertube marine boiler with a total heating surface of 2500 square feet; working pressure, 200 pounds; fuel, oil. Soot blowers, Diamond Power Specialty Corp. Oil burning equipment, Babcock & Wilcox.

Auxiliary Generator—Westinghouse

AUXILIARY EQUIPMENT

Pumps—Worthington Pump & Mach. Corp.
Windlass—Hyde Windlass Co.
Hoister—Hyde Windlass Co.
Steering Engine—Hyde Windlass Co.
Propellers—Bath Iron Works Corp.
Refrigeration—Frigidaire Corp.
Anchors—Baldt Anchor, Chain & Forge Corp.
Plumbing Fixtures—Crane Co.
Valves & Fittings—Crane Co.
Revolution Counters—Alexander McNab
Circulating Pump Engine—Troy Eng. & Mach.
Galley Ranges, etc.—Elisha Webb & Son Co.
Telegraphs—Chas. J. Henschel & Co. Inc.
Running Light Panels—C. J. Henschel & Co.
Thrust Bearings—Kingsbury Machine Works
Feed Water Heater—Davis Engineering
Controls (electrical)—Cutler-Hammer

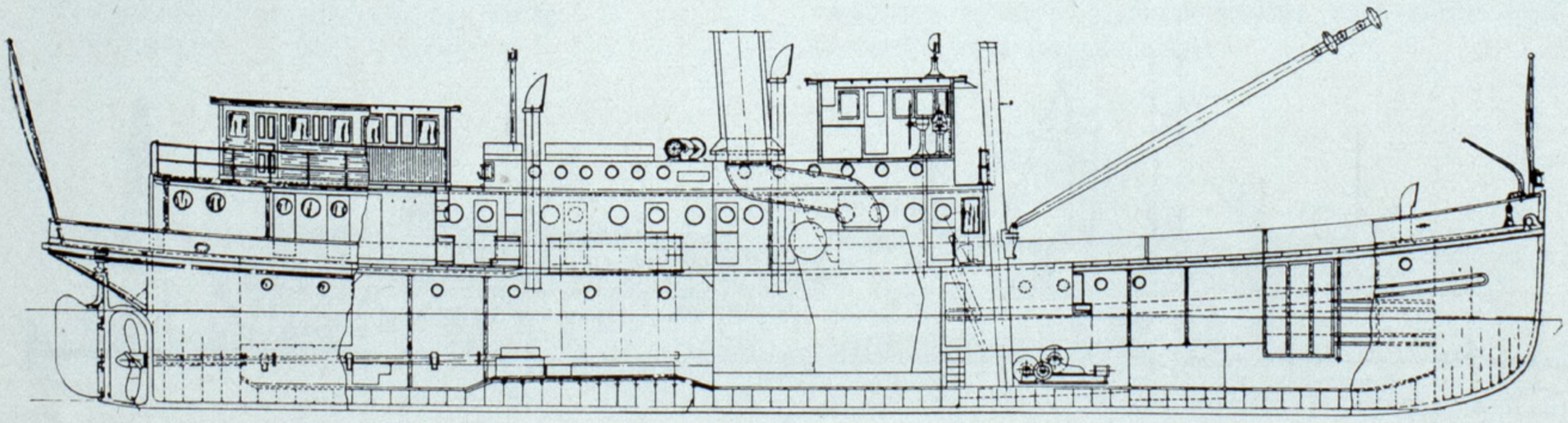
DESCRIPTION

Lighthouse tender of shallow draft, designed especially for the building of light structures and the tending of buoys in the rivers, inlets and other shallow waters of the Long Island sound area. A steel vessel, single screw wih steam reciprocating propelling machinery, having a speed of 11 knots.

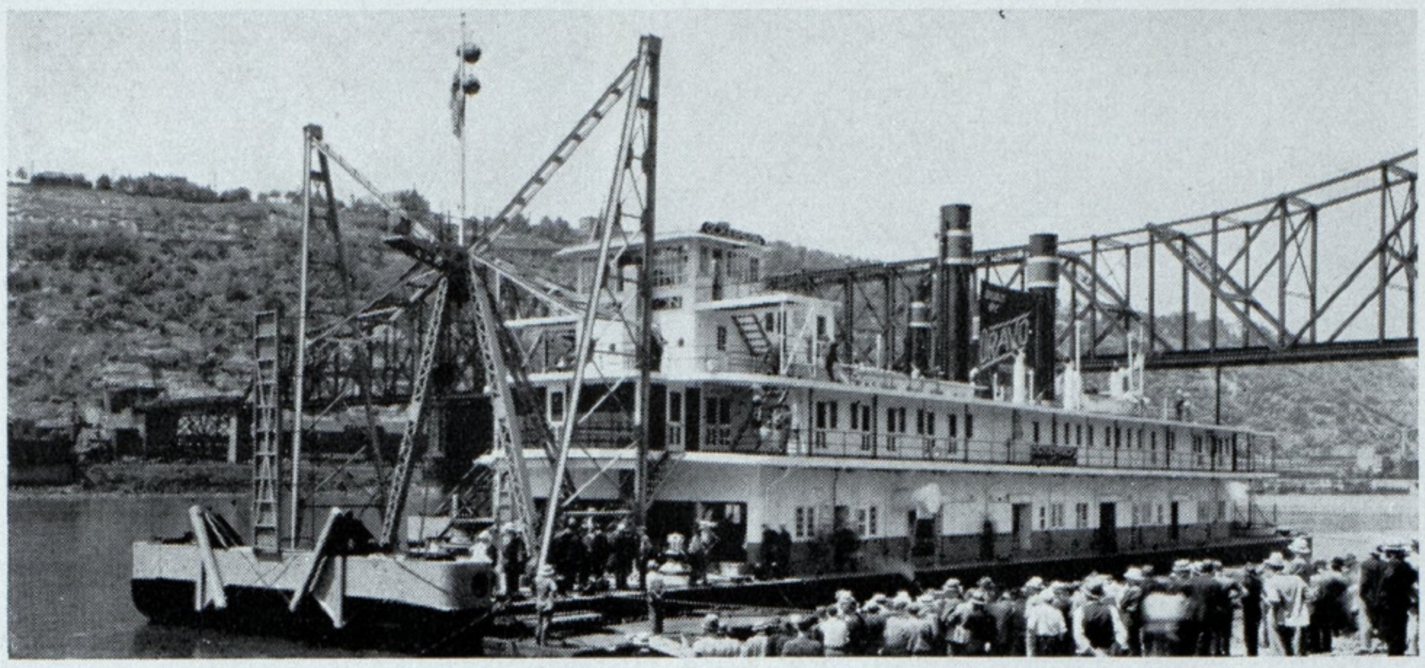
REMARKS

Bids on building the HICKORY were received from ten companies and were opened in the spring of 1932. The Bath Iron Works Corp., Bath, Me., was the low bidder at $152,480. It was stipulated that the vessel should be completed within 300 days. This vessel is a second class or inside tender and replaces the PANSY in the third lighthouse district for constructing and maintaining aids to navigation in Long Island sound and adjacent waters.

Vessels of this class are specially equipped for handling buoys and other heavy objects. The principal machinery on the main deck is a large four drum steel driven hoisting engine with cable operating through a steel mast and lattice boon to form a derrick forward of the superstructure. The HICKORY also has an electric windlass and steam steering gear. The launching took place at Bath, Me., on Feb. 9 and the new vessel was sponsored by Mrs. Thomas P. Fowler, wife of Superintendent Constructor Fowler, who represented the department of commerce at Bath during the construction.



OCKERSON—Dredge—Rivers—Twin Screw—Steam



DESCRIPTION

This vessel and sister ship, POTTER, of substantial steel construction, are 32-inch, self-propelled, twin screw, suction dredges for the United States Engineers at Memphis, Tenn., and are now in use for channel maintenance on the Mississippi river. Removal of sand bars is one of the special functions of these barges.

Name—OCKERSON
Owner—United States Engineers
Builder—The Dravo Contracting Co.
Naval Architect—J. W. Gerell
Launched—Mar. 22, '32; comp., July 6, '32
Sister Ship—POTTER; launched, Feb. 26, 1932; completed, July 6, 1932
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 214 feet, 6 inches; breadth molded, 46 feet; depth molded, 9 feet; draft, 5 feet; gross tonnage, 810; net tonnage, 769; bunker fuel oil capacity in tons, 60; speed, statute miles per hour, 11.

MACHINERY PARTICULARS

Main Engines—Two, vertical, triple expansion, steam engines, 12 x 20 x 33 inches by 24 inches stroke. Each engine has a normal rating of 600 horsepower at 180 revolutions per minute, and a maximum rating of about 800 horsepower at 210 revolutions per minute. Built by Nordberg Mfg. Co. Each engine is direct connected to a propeller. The engines operate on 225 pounds per square inch steam pressure, 50 degrees Fahr. superheat and 26 inches vacuum.

Boilers—Two, watertube marine boilers with a total heating surface of 8400 square feet, built by Foster Wheeler Corp.; working pressure, 225 pounds per square inch; superheat, 50 degrees Fahr.; fuel, oil. Oil burning equipment supplied by Ray Burner Co. Soot blowers, Diamond Power Specialty Corp.

Generating Sets—Two, turbine, 15 kilowatt, Westinghouse; De Laval turbines.

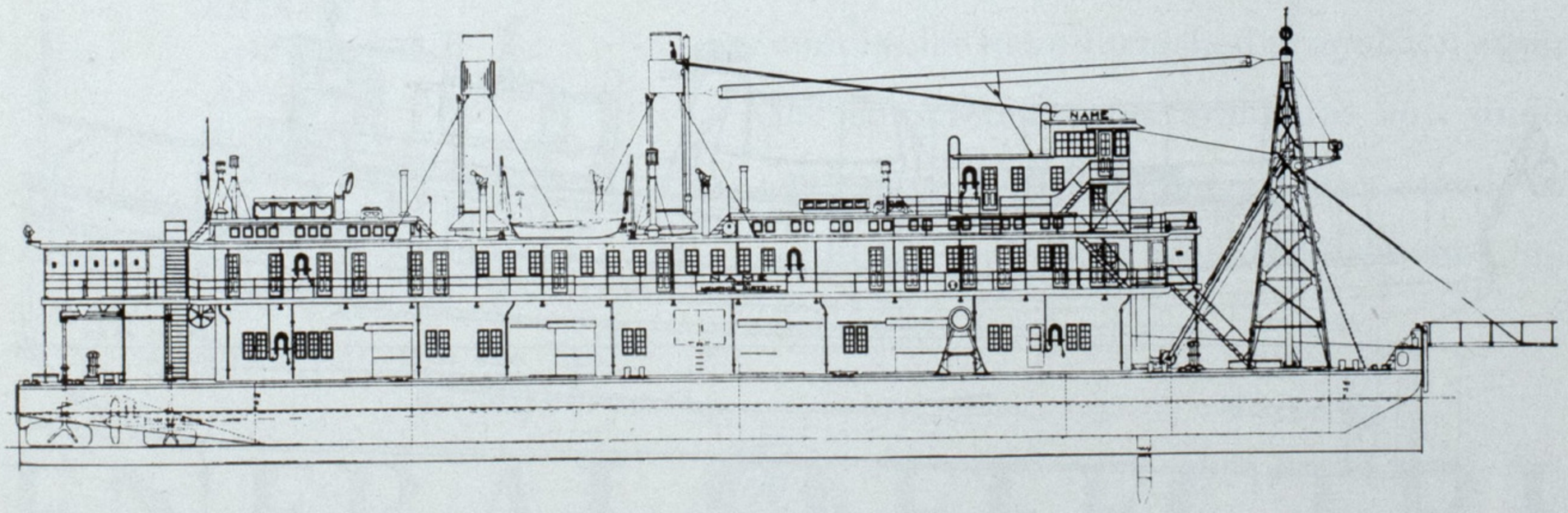
Dredging Pump—Driven at 175 r.p.m. through double reduction Falk gearing by Moore steam turbine developing 1250 b.h.p. at 3600 r.p.m. The turbine operates on steam at 225 pounds pressure with 150 degrees Fahr. superheat and at vacuum of 28 inches.

AUXILIARY EQUIPMENT

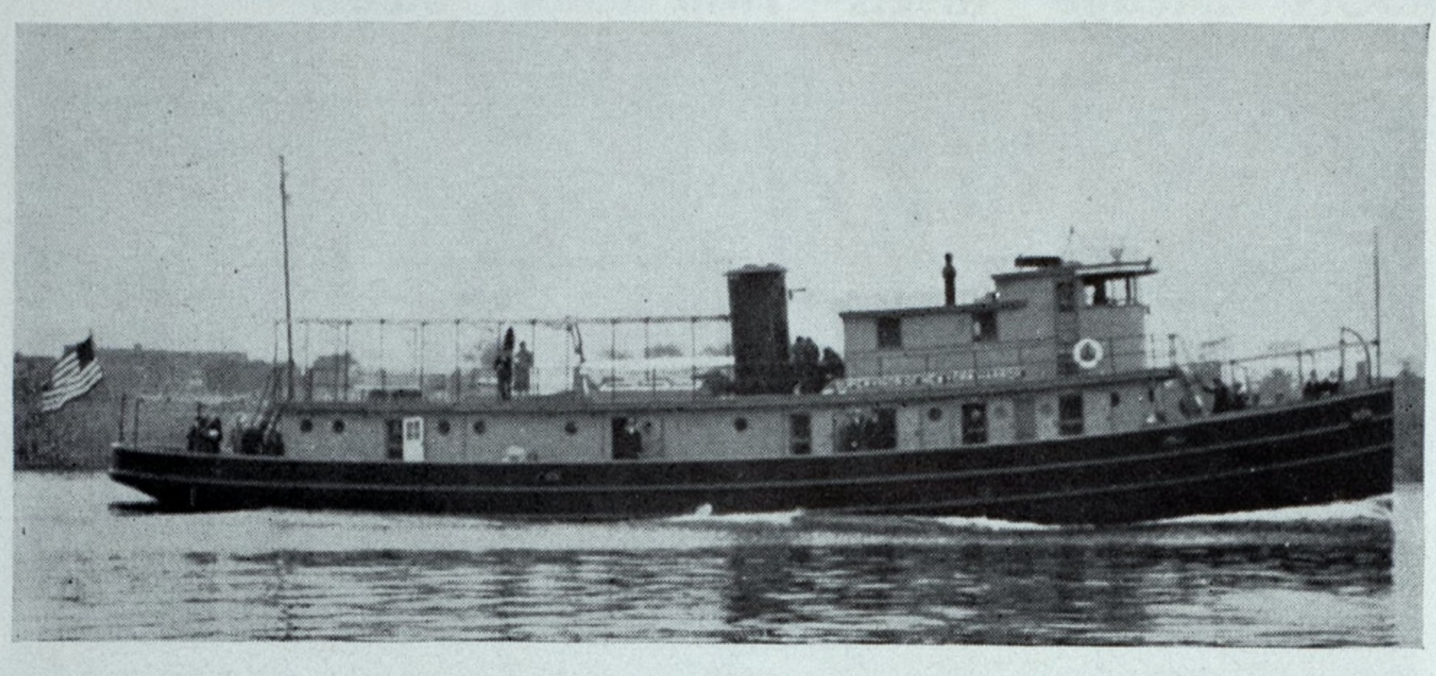
Pumps—Warren Steam Pump Co. Inc.
Winches—Lidgerwood Mfg. Co.
Steering Gear—Dravo Contracting Co.
Refrigeration—Baker
Condensers—C. H. Wheeler Mfg. Co.
Evaporators, Distillers—Griscom-Russell
Feed Water Heaters—Griscom-Russell Co.
Feed Water Filters—Griscom-Russell Co.
Oil Purifier—Goulds Pumps Inc.
Combustion Recorders—The Permutit Co.
Galley Equipment—Elisha Webb & Son Co.
Fans (Staterooms)—Westinghouse
Switchboard—Westinghouse Electric
Telegraphs (Mechanical)—Chas. J. Henschel
Marine Hardware—Dayton Mfg. Co.

REMARKS

These dredges are of suction type. There are two main divisions to the machinery on board. Propulsion is by means of twin screws operating in tunnels and driven by triple expansion, reciprocating steam engine. The powerful main suction pump designed by the office of the chief of engineers, United States army, is driven by a 1250 to 1400 brake horsepower steam turbine through double reduction gearing.



ACTIVE—Patrol Boat—Harbor—Single Screw—Diesel



Name—ACTIVE
Owner—U. S., Supervisor of New York Harbor
Builder—Spedden Shipbuilding Co. Inc.
Naval Architect—United States Engineers
Launched—Aug. 16, '32; completed, Oct. 31
Classification—Equal to American Bureau

HULL PARTICULARS

Length over all, 121 feet, 6½ inches; length between perpendiculars, 114 feet, 3 inches; breadth molded, 24 feet; depth molded, 12 feet, 6 inches; draft, 8 feet; gross tonnage, 300; bunker diesel fuel capacity in gallons, 9300; speed, 14 statute miles per hour.

MACHINERY PARTICULARS

Main Engine—One, Fairbanks-Morse Co., two cycle, six cylinder, diesel engine, direct connected to propeller. Brake horsepower, 550 at 250 revolutions per minute. Size, cylinders 14-inch bore, stroke 17 inches.

Auxiliary Generators—Two, each 30 kilowatts, Fairbanks-Morse diesel generator sets. When all machinery is shut down, a 56 cell Exide storage battery supplies electric current. This battery is floated on the line when one of the two generator sets is not working.

AUXILIARY EQUIPMENT

Pumps—Fairbanks, Morse Co.
Windlass—American Engineering Co.
Winches—American Engineering Co.
Steering Gear—Sperry Gyroscope Co. Inc.
Propellers—Spedden Shipbuilding Co. Inc.
Refrigeration—General Electric Co.
Oil Burning Equip.—W. S. Ray Mfg. Co. Inc.
Oil Purifier—Goulds Pumps Inc.
Plumbing Fixtures—Crane Co.
Valves, Fittings—Crane Co.
Stern Bearings—Rubber, B. F. Goodrich Co.
Galley Ranges, etc.—Elisha Webb & Son Co.
Floats—Welin Davit & Boat Corp.

DESCRIPTION

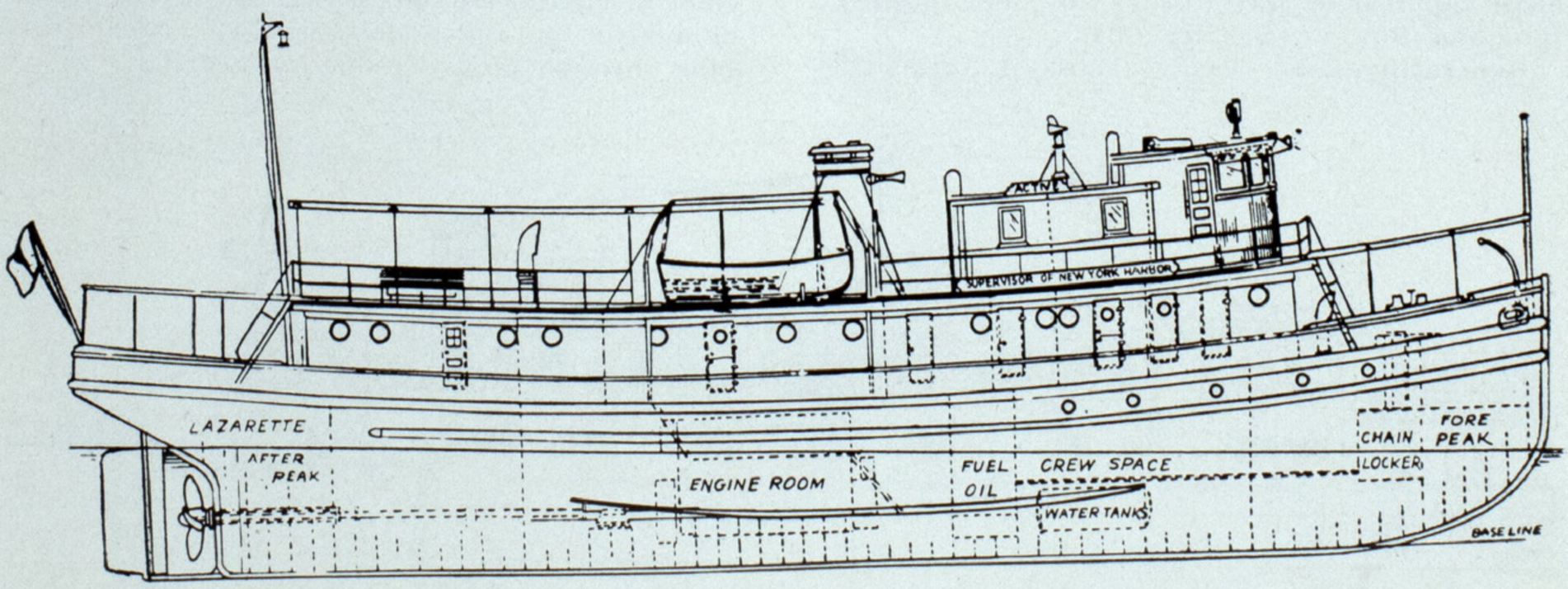
A substantial steel vessel, propelled by a single diesel engine of 550 horsepower. Latest addition to the fleet of the Supervisor of New York harbor, this vessel is now in use on patrol duty. The deck house is of steel construction. The main propelling machinery is located slightly aft of amidships.

REMARKS

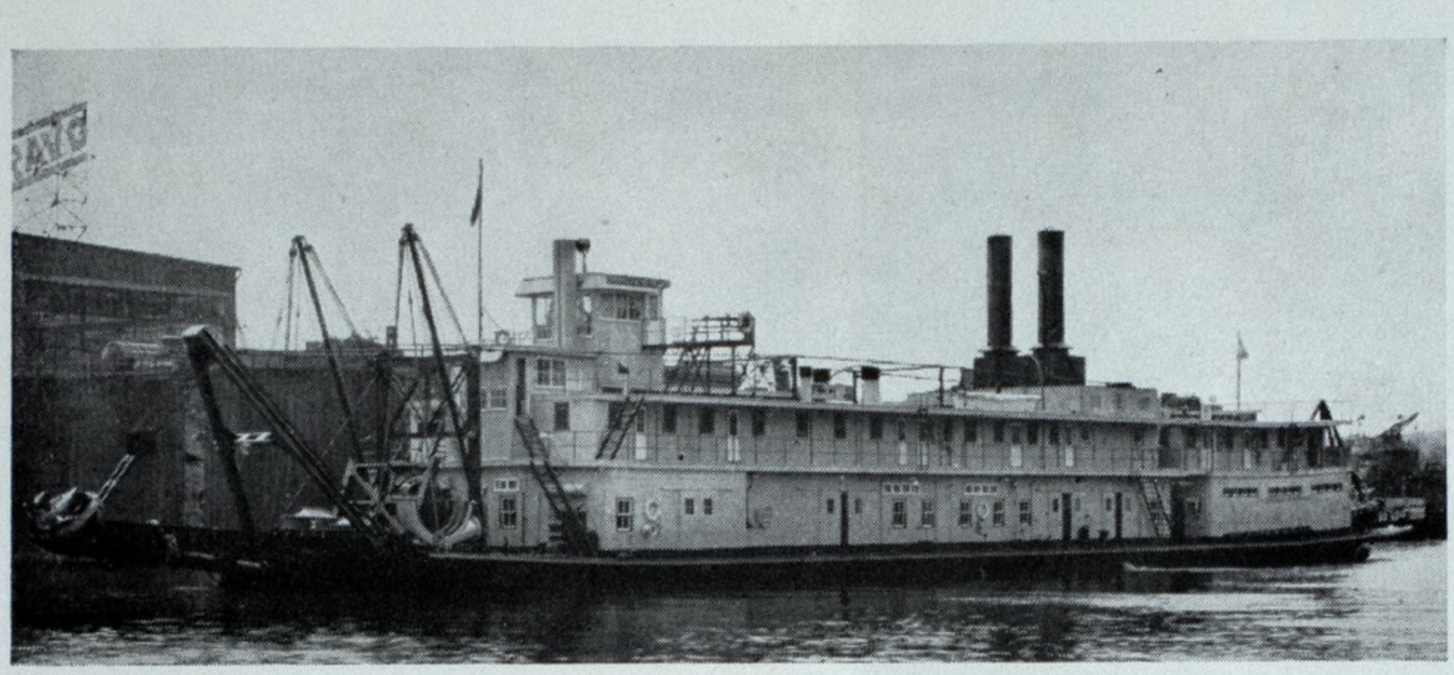
The ACTIVE is a staunch and able vessel of trim appearance and is used under the direction of Capt. R. Drace White, U. S. N., supervisor of New York harbor in patroling these waters for the enforcement of government regulations in regard to waste disposal and to prevent harbor polution. She may also be used in general supervision of dredging operations.

The accompanying illustrations indicate the general layout. The hull is somewhat along the line of a large ocean-going tug. The deck house which is of steel is of greater extent than is customary on tugboats. Quarters for personnel are provided mainly in the deck house. Quarters for the supervisor are located forward of the main saloon at the after end of the deck house. The captain and mate are provided with rooms in the texas and the two engineers are located on the main deck, forward of upper engine room.

During the trials the vessel demonstrated excellent maneuvering and seagoing qualities. There was a minimum of vibration. The propeller of solid bronze is 72 inches in diameter and of equal pitch.



SAINTE GENEVIEVE—Dredge—Rivers—Sternwheel—Steam



Name—SAINTE GENEVIEVE
Owner—United States Engineers
Builder—The Dravo Contracting Co.
Naval Architect—C. H. Giroux
Launched—Oct. 1, '32; comp., Nov. 23, '32
Sister Ship—GRAFTON. Launched, Oct. 22, 1932; completed, Dec. 24, 1932.
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 265 feet, 2 inches (over cutter head); length between perpendiculars, 200 feet; breadth molded, 47 feet 10 inches; depth molded, 8 feet; draft, 4 feet 9 inches; displacement loaded, 1250 tons; gross tonnage, 947; net tonnage, 701; bunker fuel oil capacity in tons, 90; speed, 11 statute miles per hour.

MACHINERY PARTICULARS

Main Engines—Two, horizontal, tandem compound, condensing, reciprocating steam engines; cylinders, 16, 32 inches in diameter by 84 inches stroke. At a speed of 19 r. p. m., these two engines develop a total of 900 horsepower; at 20 r. p. m., they develop about 1000 horsepower. They operate on steam at 300 pounds pressure, 100 degrees Fahr. superheat and 20 inches vacuum. Each engine is connected through pitmans of steel tube type with a sternwheel, 20 feet in diameter, 27 feet long, having 14 arms with 30 inch buckets. Engines and paddle wheels for both the Saint Genevieve and the Grafton were designed and built by the Nordberg Mfg. Co.

Boilers—Two, Babcock & Wilcox, watertube marine boilers with a total heating surface of 6520 square feet and 374 square feet of superheating surface. Working pressure, 305 pounds; superheat, 100 degrees Fahr.; fuel, oil. Superheaters, desuperheaters, and oil burning equipment supplied by the Babcock & Wilcox Co. Soot blowers, Diamond Power Specialty.

Generators—For supplying current for electric motor driven dredge pump and cutter. De Laval steam turbine and reduction gear driving one 1000-kilowatt and one 200-kilowatt, both 250 volts, direct current, Westinghouse generators on the same shaft.

Dredge Pump Motor—One Westinghouse, 1200 h. p., at 250 volts, 200 to 250 r. p. m. Also, one 225 h. p., Westinghouse motor, at 350 to 450 r. p. m. for driving cutter.

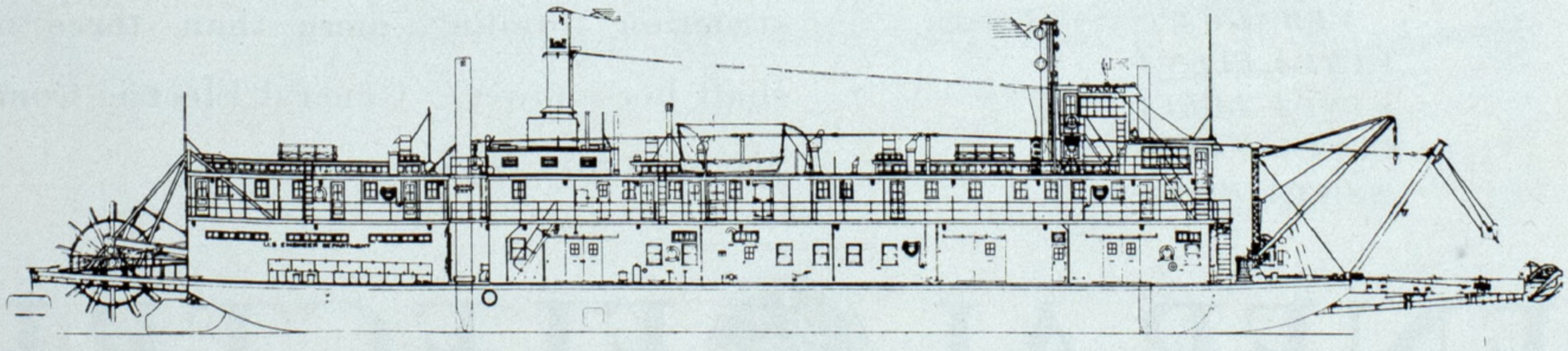
Auxiliary Generators—Two, DeLaval turbine driven, Westinghouse generators each 75 k.w., 120 volts, direct current. Both main and auxiliary generator sets operate on steam at 300 pounds pressure, 100 degrees Fahr. superheat and 26 inches vacuum. Also, one 15 k.w. De Laval turbine driven Westinghouse generator.

AUXILIARY EQUIPMENT

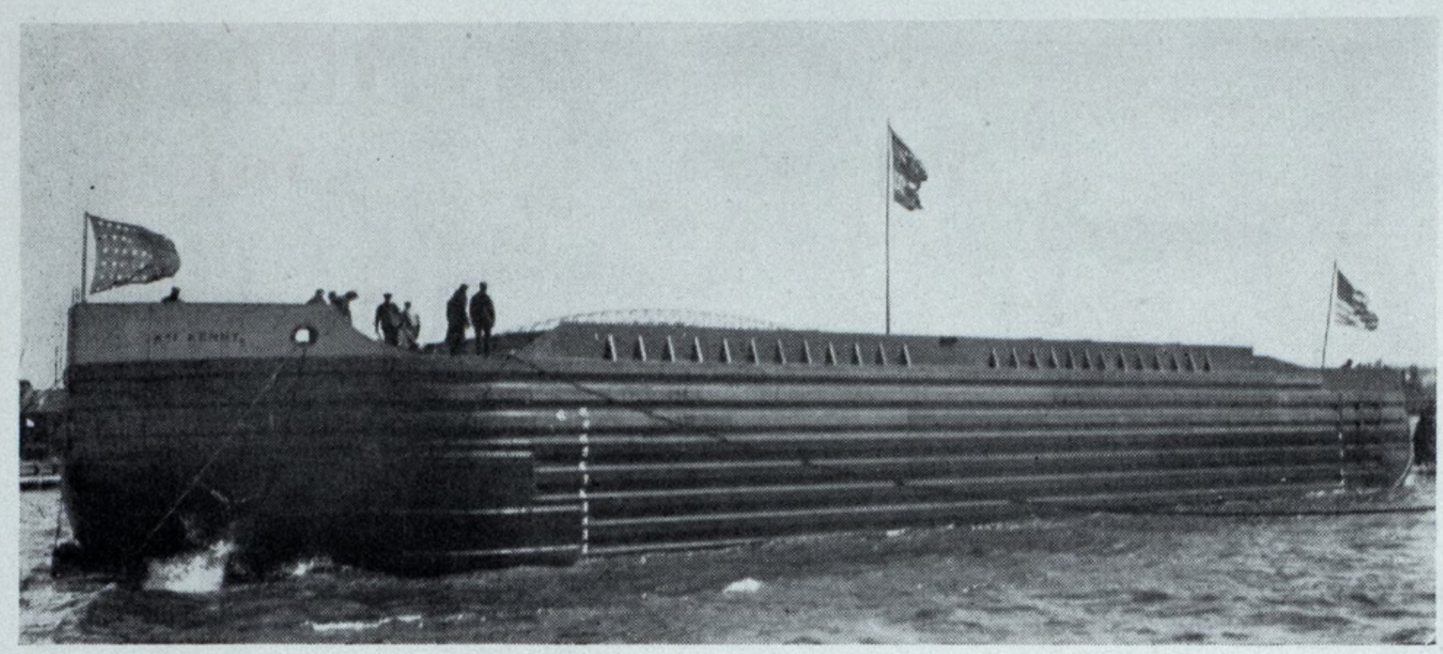
Pumps—Worthington Pump & Mach. Corp.
Windlass, Winches—Lidgerwood Mfg. Co.
Steering Gear—Dravo Contracting Co.
Refrigeration—Baker Ice Machine
Valves and Fittings—Crane Co.
Marine Hardware—The Dayton Mfg. Co.
Evaporators—Griscom-Russell Co.
Feed Water Heaters—Griscom-Russell Co.
Feed Water Filters—Griscom-Russell Co.
Galley Equipment—Elisha Webb & Son Co.
Electric Motors—Westinghouse
Controls, Switchboard—Westinghouse
Fans (Staterooms)—Westinghouse
Oil Purifier—Goulds Pumps Inc.

DESCRIPTION

This dredge and sister vessel, GRAFTON, are 20-inch self-propelled pipe line dredges, with horizontal tandem compound steam reciprocating engines for propulsion and powerful electric motor driven cutter and dredge pump. Motors receive current from two generators driven by one main steam turbine.



WM. F. KENNY—Freighter—Coast—Twin Screw—Diesel



Name—WM. F. KENNY
Owner—New Jersey Clay Products Co. Inc.
Builder—United Dry Docks, Staten Island
Naval Architect—Henry J. Gielow Inc.
Launched—Feb. 28, 1933
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 185 feet; length between perpendiculars, 180 feet; breadth molded, 43 feet 1½ inches; depth molded, 16 feet; draft, 9 feet, 6 inches; displacement loaded, 1660 tons; gross tonnage, (approximately) 1000; cargo capacity, 610 special containers holding approximately 2 tons of tiles each; cargo capacity in cubic feet, 91,000; bunker diesel fuel oil capacity in tons, 70; speed in service 10 knots.

MACHINERY PARTICULARS

Main Engines—Two, 6-cylinder, 4-cycle, airless injection, diesel engines, 14-inch bore by 16-inch stroke, each developing 350 brake horsepower at 250 revolutions per minute. Each engine is direct connected to a propeller and is reversible. The engines were supplied by the Winton Engine Corp.

Auxiliary Generator—One, 25 kilowatt at 700 revolutions per minute driven by a 40 horsepower Cummins diesel engine; General Electric generator.

Air Compressors—Two, each 16 cubic feet at 550 revolutions per minute, Winton; chain driven from each main engine. One independent compressor driven by Cooper-Bessemer gasoline engine.

AUXILIARY EQUIPMENT

Windlass (electric)—Lidgerwood Mfg. Co.
Steering Gear (electric)—Lidgerwood
Galley Equipment—Elisha Webb & Son Co.
Crane—Silent Hoist, Winch & Crane Co.
Boat—Welin Davit & Boat Corp.
Propellers—United Dry Docks Inc.
Electric Generators—General Electric

DESCRIPTION

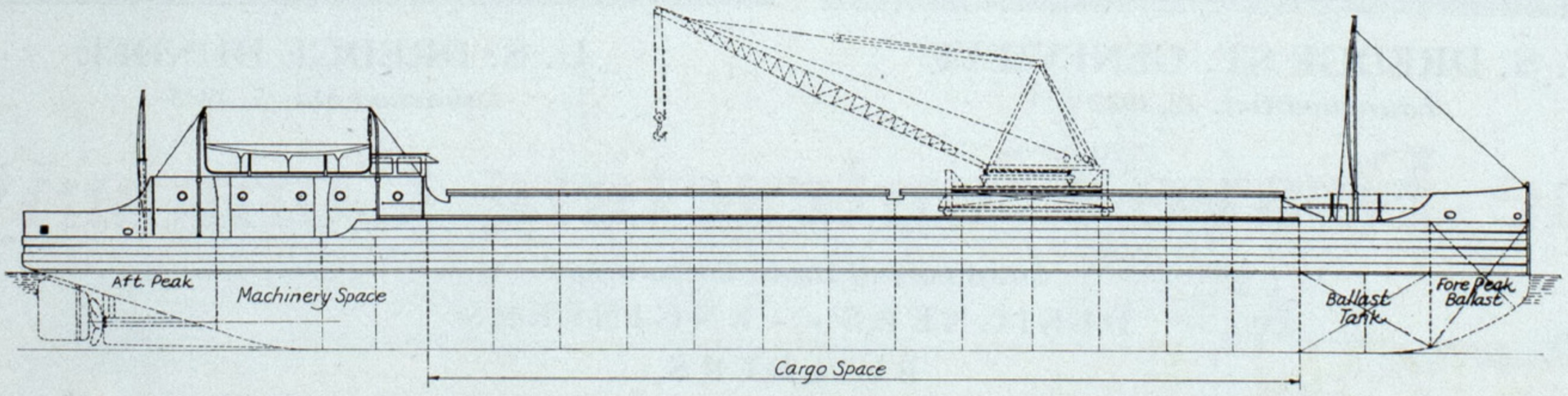
According to the builder, this is the first self-propelled and ship shape reverse channel vessel ever built. It is constructed on the patented reverse channel system. The flanges of the channels overlap each other to form a lap welded seam. The lap weld, eliminates warping and locked-in stresses.

REMARKS

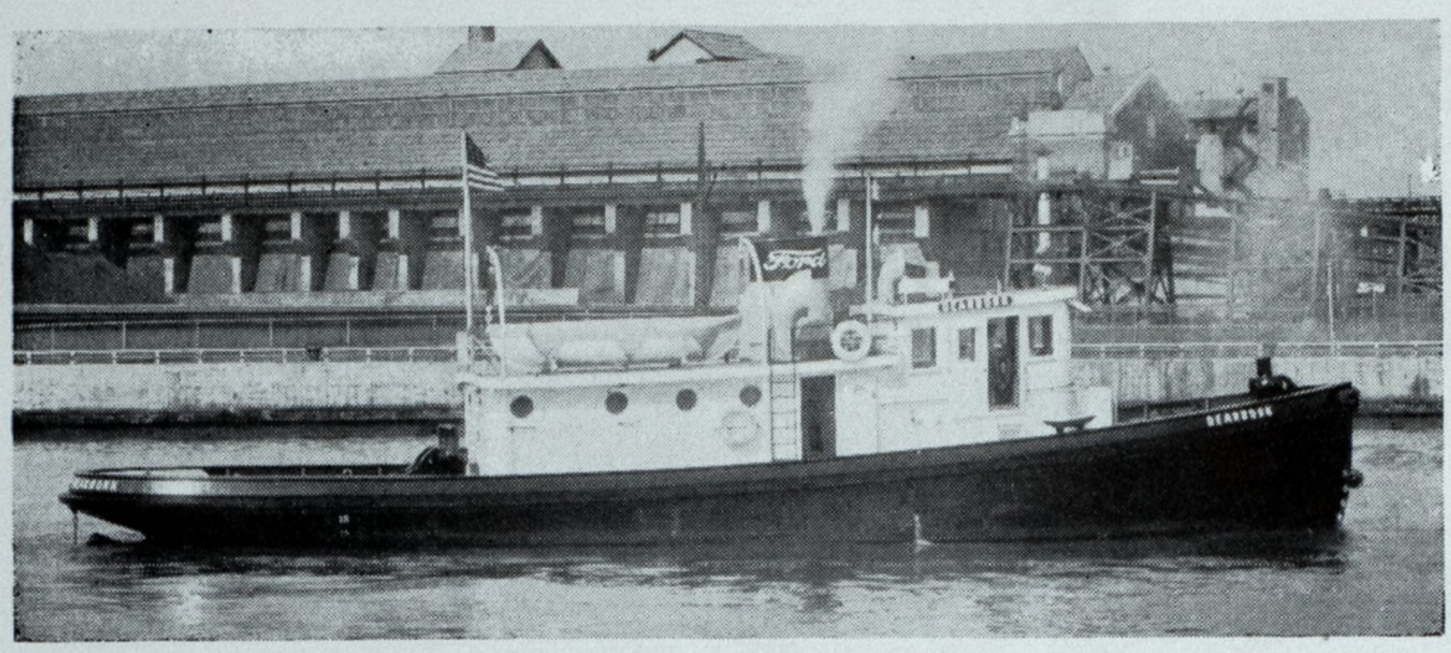
There are some unusually interesting modern features about the design and construction of this vessel. Welded construction has been applied using the patented reversed channel system invented by Johannes Kjekstad, consulting engineer for the builder. This method of construction has the advantage of reducing building cost over that of the ordinary framed and riveted structure. The weight of the hull is also reduced which gives a proportionately greater carrying capacity.

Another feature of the design of the WM. F. KENNY is the development of the package carrier idea. In this particular case a collapsible container is used so that on the return voyage, light, each container is stowed practically flat. The new vessel will carry hollow building tile, in these special steel containers, between the ports of New York, Washington, Philadelphia and Wilmington. A full load will consist of 2 tons of tile in each of 610 special containers mentioned. Each container weighs 250 pounds.

For expeditious handling of cargo a crane has been made by the Silent Hoist, Winch & Crane Co., Brooklyn, N. Y. This crane has a 45-foot boom and a reach of 40 feet over side. Its customary load is 4250 pounds, but it will handle a load of 10 tons at a radius of 10 feet. The crane table is arranged to move fore and aft and athwartships on steel rails. There are two hatches, both 39 feet wide, one 54 feet long and the other 47 feet long.



DEARBORN—Tug—Lakes—Single Screw—Diesel Electric



DESCRIPTION

Designed as a harbor tug with no crew accommodations. Propelling machinery consists of two diesel driven generating sets and one electric motor direct connected to propeller. Total shaft horsepower developed is 500 at 124 revolutions per minute of propeller, while the vessel is running free.

Name—DEARBORN
Owner—Ford Motor Co.
Builder—Great Lakes Engineering Works
Naval Architect—Henry J. Gielow Inc.
Launched—June 15, '32; comp., Jul. 20, '32
Classification—Owner's Requirements

HULL PARTICULARS

Length over all, 85 feet; length between perpendiculars, 75 feet; breadth molded, 21 feet; depth molded, 13 feet; draft extreme. 12 feet; gross tonnage, 109; net tonnage, 65; bunker diesel fuel capacity in gallons, 4650; speed, 12 statute miles per hour.

MACHINERY PARTICULARS

Main Engines—Two, 8-cylinder, 4-cycle, solid injection diesel engines, 9-inch bore by 12-inch stroke, built by Cooper-Bessemer Corp. Each engine develops 330 horsepower at 475 revolutions per minute, and is direct connected to an electric generator and exciter.

Main Generators—Two, each of 205 kilowatts, 240 volts, direct current, with an attached 15-kilowatt, 125-volt direct current exciter, built by Westinghouse Electric & Mfg. Co. Each of these generators is driven by the above mentioned diesel engines of 475 revolutions.

Main Propulsion Motor—One, of 500 horsepower, double armature, 240 volts per armature, 125 revolutions per minute, direct current, Westinghouse propelling motor, complete with Kingsbury thrust bearing.

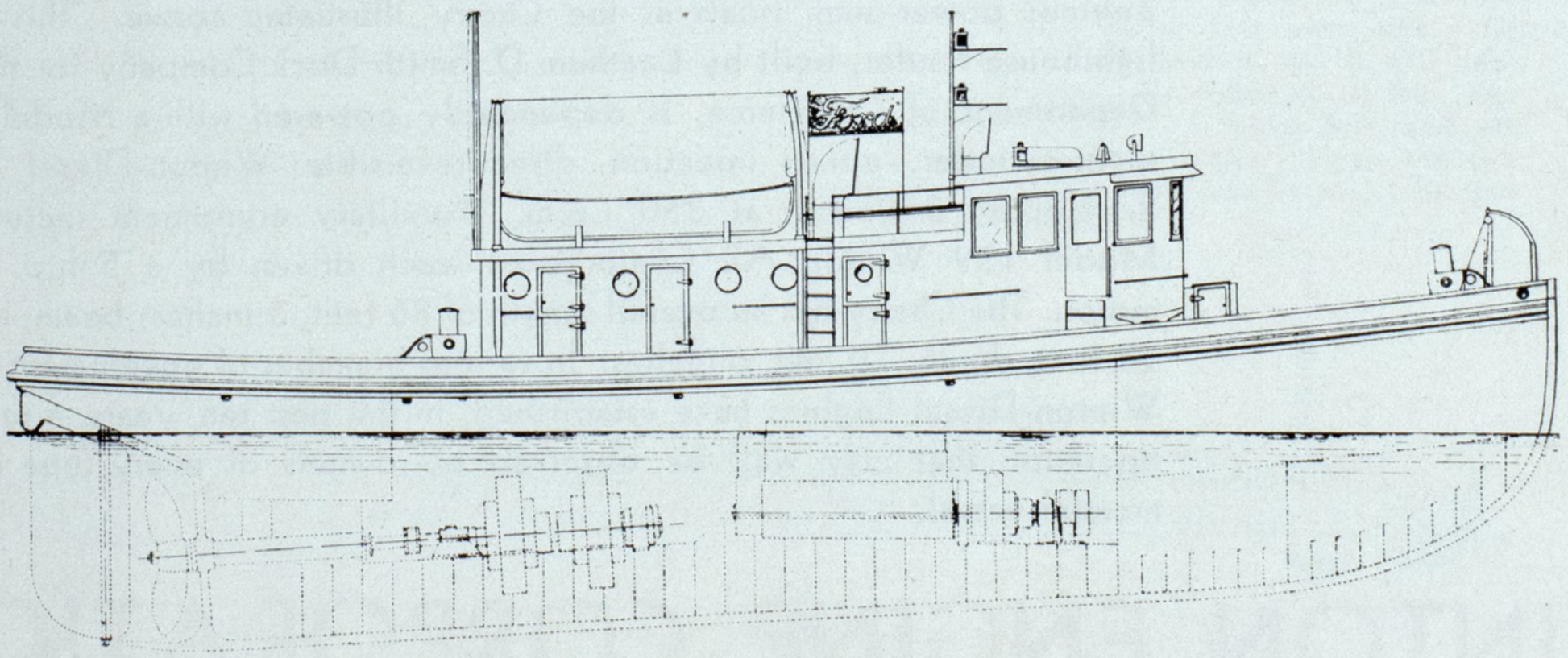
Auxiliary Generator—One, 7½-kilowatt, Hill diesel engine driving a Westinghouse generator, and also Ingersoll-Rand compressor and pump by Northern Pump Co., all combined in one set.

AUXILIARY EQUIPMENT

Pumps—Northern; Westco; Worthington
Compressor—Ingersoll-Rand Co.
Steerer—Superior Iron Wks. (Electric)
Propeller—Great Lakes Engineering Works
Oil Burning Equip.—Ray Engineering Co.
Boiler—American Radiator Co. (Heating)
Marine Hardware—Dayton Mfg. Co.
Control Equipment—Westinghouse
Plywood—Haskelite Mfg. Corp.
Clocks—Chelsea Clock Co.
Running Light Panels—Chas. J. Henschel
Oil Purifier—Goulds Pumps Inc.

REMARKS

In the design of the DEARBORN, one of the chief objectives in addition to economy of operation was to be able to absorb the full horsepower at reduced revolutions. This can be done by the use of electric drive. Without sacrificing engine efficiency, this vessel, a substantially constructed, large, heavy tug boat, has available at instant call the maximum horsepower for maneuvering. By using the Ward-Leonard system of control the tug can be operated either from the pilot house or the engine room, whichever suits the pilot who is at all times in complete control.



WYLIE L. MOORE—Towboat—Rivers—Sternwheel—Diesel

Name—WYLIE L. MOORE
Owner—The Pure Oil Co.
Builder—Charleston D. D. & Machine Co.
Naval Architect—L. Louis Green Jr.
Launched—Sept. 9, '32; comp., Dec. 15, '32
Classification—Owner's requirements

HULL PARTICULARS

Length over all, 105 feet; length between perpendiculars, 88 feet; breadth molded, 24 feet, depth molded, 4 feet, 3 inches; draft, 2 feet, 6 inches; displacement loaded, 110 tons; gross tonnage, 76; bunker diesel fuel capacity; in tons, 8.14; speed, 9 to 10 statute miles per hour.

MACHINERY PARTICULARS

Main Engine—One, 2-cycle, 4-cylinder, crosshead type of diesel engine. Cylinders 12½ inches in diameter; stroke, 13¼ inches. Brake horsepower, 240 at 325 revolutions per minute. This diesel engine designed and built by the Worthington Pump & Machinery Corp.

Auxiliary Generators—Two, Novo engine driven 4 k.w. generators. One Northern 60-gallons per minute pump, also connected to one of the Novo generating sets. The other generating set also has attached an air compressor.

AUXILIARY EQUIPMENT

Pumps—Northern Pump Co.
Capstan—American Engineering Co.
Steering Gear (air)—Marietta Mfg. Co.
Stern Wheel—Keck Gonnerman Co.
Refrigeration—Frigidaire Corp.
Galley Equipment—Elisha Webb & Sons

REMARKS

Economy and special suitability for operating on protected and shallow waters in towing oil barges from Savannah to Augusta, Ga. were the main objectives in designing and building the WYLIE L. MOORE. Her dimension and power were settled upon this basis. The choice of a diesel engine for propulsive power gives a low operating cost not possible for a steam drive in a vessel of this size and power. Due to the shallow draft restrictions it was felt that stern-wheel propulsion would give the best results, and greatest efficiency. The entire propelling drive equipment including the reduction gear box, intermediate shaft and the water wheel, 14 feet in diameter fitted with 12 buckets, was manufactured by the Keck Gonnerman Co., Mt. Vernon, Ind.

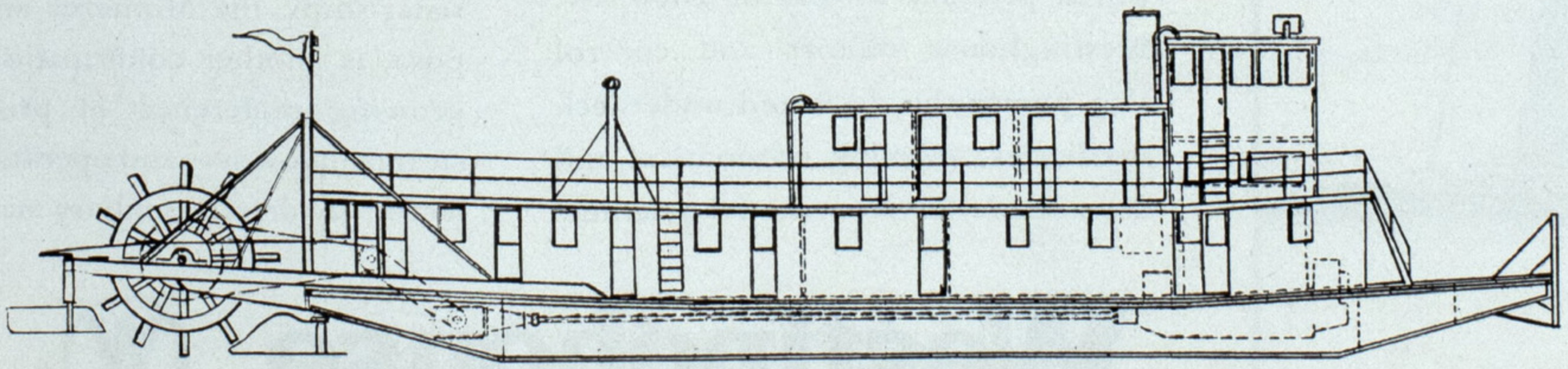
The cabins and pilot house are of wood construction. Modern equipment on this vessel includes one model M-9 Frigidaire refrigerator; one Webb galley range with Valjean burner; and one 12-inch arc Carlyle & Finch searchlight. As noted above there are two Novo 4-kilowatt generating sets, one of which is also connected to a 2½ x 4 inches Worthington compressor and the other to a 60-gallons per minute Northern pump. A Nugent patented oil filter has been fitted in the fuel line.

All the water from the sea chest passes through a 2-inch Brassert filter which eliminates 90 per cent of all foreign matter. This filter is connected by sprocket and chain to the main drive shaft.

There are two main and two auxiliary, or "monkey" rudders, all connected with reach rods and cables to a Marietta Mfg. Co. air steerer, which is controlled by two levers in the pilot house.

DESCRIPTION

The WYLIE L. MOORE was designed for the Pure Oil Co. to tow oil barges from the company's terminal at Savannah to Augusta, Ga. The hull is of steel and is of all welded construction, using the R. F. Smith patented system. The hull is divided into 13 separate compartments and is believed to be unsinkable.



Merchant Type Steel Vessels Over 100 Tons Under Construction in American Shipyards During 1932

Vessels Completed, Alphabetically Arranged

Vessel	Yard	Type	Class	Gross	Owners	Mach.	H.P.	Len. ft. in.	Beam ft. in.	Dep. ft. in.	Fuel	Remarks	Status
Acadia	Newport News S. B. Co.	Pass.	Ocean	6185	Eastern Steamship Co.	Turbine	11400	402 11	61	29 9	Oil	Express Coastal Liner	Completed
Active	Spedden S. B. Co. Inc.	Patrol	Harbors	234	Supervisor, N. Y. Harbor	Oil Eng.	550	121 6½	24	12 6	Oil	New York Harbor Patrol	Completed
Antigua	Fore River, Beth. S. B. Co.	Pass.	Ocean	6982	United Mail S. S. Co.	Turb. Elec.	10500	447 8	60	34 9	Oil	Pacific Coast, So. America	Completed
Argo	John H. Mathis Co.	Patrol	Ocean	334*	U. S. Coast Guard	Oil Eng.	1340	165	25 4	13 3	Oil	Twin Screw Diesel	Completed
Beaver††	McClintic Marshall Corp.	Dredge	Rivers	439*	U. S. Engineers	Recip.	150	100	34	8	Coal	Dipper Dredge	Completed
Bridgeport†	John H. Mathis Co.	Tug	Sound	151	Red Star Tow. & Trans. Co.	Oil Eng.	700	92	23	11	Oil	Harbor, Sound Service	Completed
Calypso	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Completed
Capt. Meriwether Lewis	Marietta Mfg. Co.	Dredge	Rivers	1500	U. S. Engineers	Recip.	1500	269	50	8 6	Oil	Missouri and Mississippi Rivers	Completed
Capt. William Clark	Marietta Mfg. Co.	Dredge	Rivers	1500	U. S. Engineers	Recip.	1500	269	50	8 6	Oil	Missouri and Mississippi Rivers	Completed
Cherry	L. D. Smith Dock Co.	Tender	Lakes	202*	U. S. Bureau Lighthouses	Oil Eng.	300	86 3	22	10 6	Oil	Great Lakes Service	Completed
Chiriqui	Newport News S. B. Co.	Pass.	Ocean	6963	United Mail S. S. Co.	Turb. Elec.	10500	446 9	60	34 9	Oil	Pass. and Freight	Completed
Colombia	Newport News S. B. Co.	Pass.	Ocean	5236	Colombian S. S. Co.	Turbine	7500	404 5	57 6	31 5	Oil	Mail and Express Service	Completed
Daphne	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Completed
Dearborn	Great Lakes Eng. Works	Tug	Lakes	109	Ford Motor Co.	Oil Elec.	660	85	21	13	Oil	Single Screw, Diesel Electric	Completed
De Witt Clinton††	Ellicott Machine Corp.	Dredge	Rivers	500	U. S. Engineers	Recip.	567	182 3	36	9	Oil	20-inch Pipe Line Dredge	Completed
Dundee	Dravo Contracting Co.	Dredge	Rivers	1450	U. S. Engineer Corps	Recip.	1000	224 1⅝	44 4	7	Oil	Miss. River Channel Dredging	Completed
Empire	Great Lakes Eng. Works	Dredge	Lakes	461	Dunbar & Sullivan	Recip.	400	125	42	10	Coal	Great Lakes—Dredging	Completed
Escanaba	Defoe B. & M. Works	Cutter	Ocean	1000*	U. S. Coast Guard	Turbine	1500	165	36	21	Oil	For Use on Great Lakes	Completed
G. F. Becker	Hansen Welding Co.	Cargo	Lakes	110	Frank Becker	Oil Eng.	150	64 9	16	9	Oil	Postoffice, Detroit River	Completed
Grafton	Dravo Contracting Co.	Dredge	Rivers	947	U. S. Engineer Corps	Recip.	1000	265 2	47 10	8	Oil	Mississippi River Dredging	Completed
Haiti	Newport News S. B. Co.	Pass.	Ocean	5236	Colombian S. S. Co.	Turbine	7500	404 5	57 6	31 5	Oil	Mail and Express Service	Completed
Hermes	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Completed
Icarus	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Completed
Irvington	United Dry Docks Inc.	Ferry	Harbors	100	Rockland Boat Corp.	Oil Eng.	70	64 10	29	8 6	Oil	Hudson River Crossing	Completed
J. A. Cummings	Ira S. Bushey & Sons Inc.	Tanker	Harbor	96	United Pet. Transp. Co.	Oil Eng.	140	81	20	8	Oil	Hull Built in 1931	Completed
Jennie Barbour	Canulette S. B. Co.	T. Boat	Harbor	150	La.-Texas Waterways Corp.	Oil Eng.	750	100	24	8	Oil	Twin Screw, Shallow Draft	Completed
Lucy	Brewer Dry Dock Co.	Tanker	Coast	382	Reinauer Transp. Co.	Oil Eng.	400	147	26	12	Oil	Long Island Sound	Completed
Manhattan	New York S. B. Co.	Pass.	Ocean	24289	The U. S. Lines Inc.	Turbine	30000	705 3	86	47	Oil	N. Y. to Channel Ports	Completed
Mark Twain	Howard Shipyards Co.	T. Boat	Rivers	513	Inland Waterways Corp.	Recip.	1000	196	42	6	Oil	River Towing	Completed
Monterey	Fore River, Beth. S. B. Co.	Pass.	Ocean	18017	Matson Oceanic S. S. Co.	Turbine	22000	631 6	79	52 9	Oil	California-Australia	Completed
Myrtle	Dubuque Boat & Boiler Co.	Tender	River	180*	U S. Bureau Lighthouses	Oil Eng.	110	93	23	7 3	Oil	Coastal, Gulf of Mexico	Completed
New York Socony	Beth. S. B. Corp., Sp. Pt.	Tanker	Coast	1539	Standard-Vac. Transp. Co.	Oil Eng.	700	263 2	45 6	15 6	Oil	Coastwise Service	Completed
Ockerson	Dravo Contracting Co.	Dredge	Rivers	810	U. S. Engineer Corps	Recip.	1400	214 10	46	9	Oil	Mississippi River Dredging	Completed
Pass Christian	Nashville Bridge Co.	Dredge	Rivers	300	McWilliams Dredging Co.	Oil Eng.	1400	140	36	9	Oil	Miss. River and Canal Service	Completed
Perseus	Bath Iron Works Corp.	Patrol	Ocean	332*	U. S. Coast Guard	Oil Eng.	1340	165	25 3	13 2	Oil	Coast Guard Patrol	Completed
Piermont	United Dry Docks Inc.	Ferry	Harbors	100	Rockland Boat Corp.	Oil Eng.	70	64 10	29	8 6	Oil	Hudson River Crossing	Completed
Potter	Dravo Contracting Co.	Dredge	Rivers	810	U. S. Engineer Corps	Recip.	1400	214 10	46	9	Oil	Miss. River Dredging	Completed
Prosperity	Midland Barge Co.	T. Boat	Rivers	130	Capt. Earl Webster	Oil Eng.	300	90	22	4	Oil	Sternwheel Towboat	Completed
Quirigua	Fore River, Beth. S. B. Co.	Pass.	Ocean	6982	United Mail S. S. Co.	Turb. Elec.	10500	447 8	60	34 9	Oil	New York, West Indies	Completed
Saint John	Newport News S. B. Co.	Pass.	Ocean	6185	Eastern Steamship Co.	Turbine	11400	402 11	61	29 9	Oil	Express Coastal Liner	Completed
Sainte Genevieve	Dravo Contracting Co.	Dredge	Rivers	947	U. S. Engineer Corps	Recip.	1000	265 2	47 10	8	Oil	Mississippi River Dredging	Completed

Sam Houston††	Ingalls Iron Works	Dredge	Rivers	1000	U. S. Engineers	Recip.	750	162 3	40	11 9	Oil	Pipe Line Dredge	Completed
Santa Paula	Federal S. B. & D. D. Co.	Pass.	Ocean	11200	Panama Mail S. S. Co.	Turbine	12000	508	72	39	Oil	N. Y.—Cent. Amer. & W. Coast	Completed
Santa Rosa	Federal S. B. & D. D. Co.	Pass.	Ocean	11200	Panama Mail S. S. Co.	Turbine	12000	508	72	39	Oil	N. Y.—Cent. Amer. and W. Coast	Completed
Seatrain Havana	Sun S. B. & D. D. Co.	Cargo	Ocean	8061	Seatrain Lines Inc.	Turbine	8800	478	63 6	38 3	Oil	Carries Loaded Freight Cars	Completed
Seatrain New York	Sun S. B. & D. D. Co.	Cargo	Ocean	8061	Seatrain Lines Inc.	Turbine	8800	478	63 6	38 3	Oil	Carries Loaded Freight Cars	Completed
Sergeant Floyd	Howard Ship Yards Co.	T. Boat	Rivers	279	U. S. Engineers	Oil Eng.	300	138	30	5	Oil	Inspection Boat	Completed
T. B. McClintic	Bath Iron Works Corp.	Tug	Harbor	100	Public Health Service	Oil Eng.	100	60 10	15 4	9 3	Oil	Quarantine Service, Boston	Completed
Todd	Dubuque Boat & B. Co.	Dredge	Rivers	770*	U. S. Engineers	Recip.	500	221	38	8	Oil	Pipe Line Dredge	Completed
Turbo††	Manitowoc S. B. Corp.	Dredge	Lakes	300	Great Lakes D. & D. Co.	Turbine	1000	120	44	11	Oil	Dipper Dredge	Completed
V. L. Keegan	Ira S. Bushey & Sons Inc.	Tanker	Harbor	96	United Pet. Transp. Co.	Oil Eng.	140	81	20	8	Oil	Hull Built In 1931	Completed
Veragua	Fore River, Beth. S. B. Co.	Pass.	Ocean	6982	United Mail S. S. Co.	Turb. Elec.	10500	447 8	60	34 9	Oil	New York, West Indies	Completed
Walter Wyman	Spedden S. B. Co. Inc.	Tug	Harbor	193	U. S. Pub. Health Ser.	Oil Eng.	650	100	23 2	14 2½	Oil	Quarantine Service, New York	Completed
Wylie L. Moore	Charleston D. D. Co.	T. Boat	Rivers	147	The Pure Oil Co.	Oil Eng.	240	105	24	5	Oil	River Towboat	Completed

Vessels Under Construction as of December 31, 1932, Alphabetically Arranged

Arbutus	Pusey & Jones Corp.	Tender	Ocean	680	U. S. Bureau Lighthouses	Recip.	1000	174 6	32	14 6	Oil	Lighthouse Tender	Under con
Barney Turecamo	Bath Iron Works Corp.	Tug	Harbor	145	B. Turecamo Towing Co.	Oil Eng.	750	93	23	11	Oil	Towing, Coastwise	Under con
Galatea	John H. Mathis Co.	Patrol	Ocean	334*	U. S. Coast Guard	Oil Eng.	1340	165	25 4	13 3	Oil	Twin Screw Diesel	Under con.
Geo. A. McWilliams	Nashville Bridge Co.	Dredge	Rivers	300	McWilliams Dredge Co.	Oil Eng.	1800	140	36	9	Oil	River Dredging	Under con.
Hickory	Bath Iron Works	Tender	Coast	400*	U. S. Bureau Lighthouses	Recip.	500	131	24 6	11 9	Oil	Used in Protected Waters	Under con.
Huck Finn	Midland Barge Co.	T. Boat	Rivers	800	Federal Barge Line	Oil Eng.	1000	160	40	8	Oil	Twin Screw, River Towboat	Under con.
Lilac	Pusey & Jones Corp.	Tender	Ocean	610	U. S. Bureau Lighthouses	Recip.	1000	170	32	13	Oil	Lighthouse Tender	Under con.
Lurline	Fore River, Beth. S. B. Co.	Pass.	Ocean	18021	Matson-Oceanic S. S. Co.	Turbine	22000	631 6	79	52 9	Oil	California—Hawaii	Under con.
Peten	Newport News S. B. Co.	Pass.	Ocean	7000	United Mail S. S. Co.	Turb. Elec.	10500	446 9	60	34 9	Oil	Segovia Rebuilt	Under con.
Santa Elena	Federal S. B. & D. D. Co.	Pass.	Ocean	11200	Grace Steamship Lines	Turbine	12000	508	72	39	Oil	N. Y.—Cent. Amer. & W. Coast	Under con.
Santa Lucia	Federal S. B. & D. D. Co.	Pass.	Ocean	11200	Grace Steamship Lines	Turbine	12000	508	72	39	Oil	N. Y.—Cent. Amer. & W. Coast	Under con.
Tom Sawyer	Midland Barge Co.	T. Boat	Rivers	800	Federal Barge Line	Oil Eng.	1000	160	40	8	Oil	Twin Screw, River Towboat	Under con.
Unknown	Canulette S. B. Co.	T. Boat	Harbor	150	La.-Texas Waterways Corp.	Oil Eng.	750	100	24	8	Oil	Twin Screw, Shallow Draft	Under con.
Washington	New York S. B. Co.	Pass.	Ocean	24289	U. S. Lines, Inc.	Turbine	30000	705 3	86	47	Oil	N. Y. to Channel Ports	Under con.
Wistaria	United Dry Docks Inc.	Tender	Coast	323*	U. S. Bureau Lighthouses	Oil Elec.	240	121 4	25	9	Oil	Delaware Bay Service	Under con.
Wm. F. Kenny	United Dry Docks Inc.	Cargo	Coast	1000	N. J. Clay Products Co.	Oil Eng.	700	185	43	19	Oil	Twin Screw Diesel	Under con.
YF 221	New York Navy Yard	Lighter	Harbor	250**	United States Navy	Oil Eng.	360	120	30	12 3	Oil	Freight Lighterage	Under con.
YG 17	Portsmouth Navy Yd.	Lighter	Harbor	302*	United States Navy	Oil Eng.	180	118 3	26	12 9	Oil	Garbage Lighter	Under con.
YG 18	Pearl Harbor Navy Yd.	Lighter	Harbor	302*	United States Navy	Oil Eng.	180	118 3	26	12 9	Oil	Garbage Lighter	Under con.
YSD 9	Pearl Harbor Navy Yd.	Derrick	Harbor	350*	United States Navy	Oil Eng.	360	104	30	7	Oil	Seaplane Wrecking Derrick	Under con.
YT 119	Boston Navy Yard	Tug	Harbor	340*	United States Navy	Oil Elec.	600	110 6	24	13 6	Oil	For Towing Service	Under con.

*Displacement. **Capacity in tons. †Hull built by John H. Mathis Co. Vessel completed and engine installed by College Point Dry Dock Co. ††Non self-propelled.

All-welded, Reverse Channel Cargo Vessel Launched

By R. D. MacMillen

THE WM. F. KENNY, one of the most interesting vessels of recent construction, was launched Feb. 28 at the Staten Island, N. Y., plant of the United Dry Docks Inc. The new vessel, fitted with diesel power in twin screws, is of all-welded, reverse channel construction and is being built for the New Jersey Clay Products Co. Inc., New York. Mrs. Wm. F. Kenny Jr., wife of the president of this company, was the sponsor.

More than 40 men prominent in naval architecture, marine engineering and shipping attended the launching of this, the first self-propelled reverse channel and the first ship-shape reverse channel vessel ever built. Henry J. Gielow Inc. is the owner's naval architect, while the patented reverse channel construction is the invention of Johannes Kjekstad, consulting welding engineer for United Dry Docks and the originator, also, of the truss-weld system.

A number of novel and valuable features of structural and operating economy are incorporated in the design, which brings the "package carrier" idea to a high development, by utilizing an ingenious collapsible container which folds practically flat for the return voyage light.

Hollow Tile in Containers

When put into commission, the WM. F. KENNY will carry hollow building tile, packed in the special steel containers, between the ports of New York, Washington, Philadelphia and Wilmington, a service which heretofore has been performed by bulk-cargo towed barges of similar capacity, built of wood. A load consists of 610 of the special containers, holding approximately two tons of tile each. The containers have solid floors and lattice walls on two sides and weigh 250 pounds each. They are 8 feet long, 3 feet 6 inches wide, 4 feet 5 inches high and have a lifting eye on each side wall. These containers are preloaded at the yards and are hoisted directly into the hold by the vessel's own crane. This crane, which is of the revolving type is built to move fore and aft and athwartships on 80 pound steel railroad tracks; while its normal load of tile is about 2 tons, it can hoist 10 tons at 10 feet radius.

Wm. F. Kenny Jr., president of the New Jersey Clay Products Co., is enthusiastic over the operating economies made possible by his new type of vessel; in an interview with the representative of MARINE REVIEW, at the launching, Mr. Kenny said:

"Aside from the structural features of this vessel, which is unique in several respects, we shall be able to effect a number of substantial operating economies. Among these is an important reduction in tile breakage, which we estimate will be of the order of 6 per cent to 8 per cent. A more spectacular saving, however, will be the greatly increased speed of turn-around and marked labor savings.

"In the operation of our older type towed barges, four days' time is required for loading, using a force of 12 men working 9½ hours a day, or 456 man-hours. The WM. F. KENNY can be loaded in two and a half days, using only the regular crew of six men, or 142½ man-hours.

"Whereas the older towed barges consumes 6 to 8 days in transit to Washington, this new vessel will arrive there in 2 days.

"The difference becomes even more marked, however, when it comes to unloading. We formerly used 24 men for 6 days, or 1368 man-hours, but the WM. F. KENNY can be unloaded in 2½ days by its regular crew of six, or 142½ man-hours.

"In other words, the former cycle of 16 to 18 days from the beginning of loading in New York to the completion of unloading in Washington now becomes 7 days; we will save 6 per cent to 8 per cent in tile breakage; and the expense and casualty risk of employing extra labor at terminals will be entirely avoided. We regard the WM. F. KENNY as a good investment."

Profile plan and detailed particulars of the WM. F. KENNY appear in the distinctive ship section of this issue, on page 30.

Reverse Channel Construction

The characteristic feature of the reverse channel design, with the webs of the channels in opposed position and the flanges electrically welded, was devised to provide that high degree of rigidity and longitudinal strength required by long, shallow craft, according to Mr. Kjedstad, the inventor, a result which is accomplished by concentrating the maximum percentage of weight into effective longitudinal strength. The proportion of weight between shell plating and internal construction is said to be approximately six to one, or better, with a moment of inertia far in excess of any other type of construction having the same hull weight.

Pointing out that the section modulus of the reverse channel section is six times greater than that of a channel section placed with the webs in the same plane, Mr. Kjekstad said:

"But this tremendous increase in strength is relatively unimportant when compared with many other advantages of the design. The flanges of the channels overlap each other to form a lap-welded seam. This seam is located in the neutral axis of the section and, therefore, is subject to minimum stresses. The lap weld eliminates warping and locked-in stresses, which frequently cause failure in butt-welded sections.

"Another feature in this design, which in some cases may prove invaluable, is the tendency of the section to stretch out transversely, in the manner of an accordion, rather than fracture, as in the case of plate or other types of flat surface construction, should a dangerous grounding or collision occur. The reverse channel system produces a shell plating which is stiff enough in itself to require very little additional stiffening; and many times in service it has demonstrated its rugged resistance to damage. With its high pay-load capacity and its low maintenance costs, I confidently expect to see the reverse channel system utilized for many other and larger types of vessel."

Illinois Waterway Ready

Freight service on the recently completed Illinois waterway was started March 3 when three barges left St. Louis for Chicago. This is the first commercial tow between these two cities by way of the Illinois and Des Plaines rivers since horse-drawn canal boats ceased operations on the Illinois and Michigan canal more than 50 years ago.

Movement of this tow marked the opening of services of the Illinois River Navigation Co. which will operate a regular service between Chicago and St. Louis. Plans have been made for regular weekly trips. A new package freight service between Chicago and Montreal has been announced by the Tree Line Navigation Co., Canada, to begin April 25. This will permit movement of cargoes on barges through the Illinois waterway to Chicago for trans-shipment to Montreal and additional transshipment for transatlantic ports.

Three ships of the Tree Line company, the CEDARBAY, WILLOWBAY and MAPLEBAY will make regular weekly calls at Chicago and en route to Montreal will stop at Detroit, Hamilton and Toronto. The three ships have a capacity of about 80,000 cubic feet. This service will provide shippers of the Middle west an opportunity to move package freight entirely by water from points located near the new Illinois waterway to Chicago and various ports.

Keeping Correct Time on Board Ship

A Vital Factor in Navigation

By J. G. Bisset

THE most important navigational instrument on board an ocean going vessel is the chronometer, by which the navigator is able to tell exact Greenwich mean time.

This correct time is necessary to enable him to calculate his latitude and longitude, or in other words to "fix the ship's position." The modern marine chronometer is a delicate and expensive type of clock, resembling in shape a small basin and having a dial about six inches in diameter. It is fitted with a cylindrical balance spring, a detached spring-detent escapement and compensation balance all of which contrivances make for very accurate time keeping in all climates.

Chronometer Carefully Housed

The chronometer is kept in a small wooden box in which it is slung face upwards in gimbels to preserve it in a horizontal position when the ship is rolling and pitching. This box fits snugly into an outer padded case to minimize vibration and jar, and both boxes have glass tops so that the time may be seen without opening them. The dial has the usual hour and minute hands, and there is also a very plainly marked smaller dial for the second hand which ticks round with a pronounced staccato movement, making it easy to read the time to the nearest half second.

A well found ship usually carries three chronometers and they are kept in the chartroom in a specially constructed glass topped case which is kept as nearly as possible at an even temperature. The navigating officer has charge of them and it is his duty to wind them at the same time every morning and to report to the captain that he has done so. He also compares them carefully and enters the result in a journal, which enables him to tell how they are behaving. Before the days of wireless time signals, this was a very necessary precaution, as one chronometer could be checked against the other, and in the event of a slight change of rate in either one of them, the two that most nearly synchronized could be taken as being in all probability correct.

In taking observations of the heavenly bodies to obtain longitude, an error of four seconds in the chronometer, or Greenwich mean time, throws the calculations out one minute of arc—equal to one nautical mile.

In old sailing ship days it was a common thing for a captain to go four or five months without having an opportunity of checking his chronometer, and if, as was often the case, only one chronometer was carried as a matter of economy, he had to be mighty cautious in making the land.

Wireless Time Signals

Nowadays wireless has come to the aid of the navigator, and it is possible in any part of the world to check the chronometers by means of wireless time signals several times a day if required. The most famous time signal in the northern hemisphere emanates from Rugby, and it is broadcast twice daily at 9:55 a. m. and 5:55 p. m., the range being practically world wide.

The method used is known as the new international system of rhythmic wireless time signals, the transmission being automatic, and by its use, accuracy to the hundredth part of a second may be obtained if desired.

The signal, which is transmitted for five minutes, consists of a dash of .4 second duration at the exact fifty-fifth minute, followed by 60 dots of .1 second then a dash at the exact fifty-sixth minute and so on to the sixtieth minute. The commencements of successive signals, whether dots or dashes, are equally spaced at intervals of 60/61 parts of one second of mean time.

The extreme accuracy that may be obtained by this method is useful for checking observatory chronometers, but is quite unnecessary for ordinary navigational purposes where a check to the nearest half second is all that is required. The system is therefore used in a modified form at sea, the procedure being as follows: A few minutes before the signal is due, the wireless operator rings up the bridge and informs the officer of the watch that he is about to receive a time signal. The officer then stands by the chronometers over which there is an electric bell connected up with the operator's key board. The operator hears the preliminary call sign G. B. R, meaning Rugby, and when the signal commences, he presses the bell at each dash which represents the exact minute, disregarding the intervening dots. The dashes occur at the fifty-fifth, fifty-sixth, fifty-seventh, fifty-eighth, fifty-ninth and sixtieth minutes; six in all, so that the officer can get two checks on each of his three chronometers.

Accuracy Checked Daily

By a series of daily checks, the amount that the chronometers are gaining or losing daily can be worked out, it is usually two or three-tenths of a second. This is known as the daily rate. The amount that a chronometer is actually fast or slow of Greenwich time is known as the accumulated rate. These rates are tabulated inside the lid of the chronometer case, and when taking time by the chronometer, the accumulated rate must be applied in order to get the correct time. This practice is employed to avoid altering the chronometer more than necessary and so inter-

(*Continued on Page* 54)

Operator waiting to send time signal, received by wireless, to the bridge for checking chronometers

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The author, Commander J. G. Bisset. R. N. R., is staff captain of the Cunard liner AQUITANIA.

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

THE rule is well settled, it was declared in the case of DREIBERGEN, 60. F. (2d) 367, that a charter must be construed according to the intent of the parties as manifested by the whole instrument rather than by the literal meaning of any particular clause taken by itself. In disposing of the contention that the charterer was entitled to a notice day of twenty-four hours at each port, which, if used, was free time, the court said: "The ship was off charter in shifting ports, and therefore in the custody of the agents of her owner. The charterer was required to designate the loading berth at each port, but, having no control over her navigation, could not be charged with knowledge of her arrival without actual notice. Notice implies notice of readiness to load. She might be at the loading wharf, and yet, for many reasons, not ready to load. Preparing the ship for loading was the duty of her master. Considering this, we think the charterer was entitled to written notice, according to the terms of the charter, at each loading port. It does not appear that written notice was ever given. But, as the charterer had actual notice at each port, and loading began as soon after arrival as possible, written notice was waived."

* * *

SHIPPERS have the undoubted right to have their freight carried to destination with customary expedition.—SALVORE, 60 F. (2d) 683.

* * *

VESSEL choosing a passing other than what was contemplated by law when a port to port passing was feasible and her choice but a matter of preference, she must be held to have chosen at her own risk whether the other vessel consent or not.—No. 2, 60 F. (2d) 733.

* * *

TEST of seaworthiness is ability for the service undertaken.—T. J. HOOPER, 60 F. (2d) 737.

* * *

IN CONSIDERING the jurisdiction of a court of admiralty in cases resulting in death it should be remembered that neither at common law nor by the general maritime law was there a right to recover for death, and that admiralty courts having jurisdiction of causes resulting in death have adopted the more humane course of following the law of states, or nations, permitting such recovery where applicable. Admiralty held to have jurisdiction of an action for death of a longshoreman on land from injuries on a vessel, notwithstanding the state statute on which the action was based was a death, not a survival, statute.—CITY OF VANCOUVER, 60 F. (2d) 793.

* * *

SHIPOWNER'S duty to give "cure" to an injured seaman is only a duty to give proper care for a reasonable time during which medical treatment may be expected to effect a cure. The shipowner's duty to furnish maintenance is co-extensive in time with his duty to furnish care. In the instand case of Skolar v. Lehigh Valley Railroad Co., 60 F. (2d) 893, it was held that if a cast was not removed from the leg of an injured seaman before he left hospital, the duty of the shipowner to provide medical treatment continued at least until it was removed.

* * *

LINSEED oil cargo, taken on at Rotterdam, was found, on arrival at New York, to be contaminated with water. In the case of ANACONDA, 60 F. (2d) 898, the court, having decided that the shipowner had not exercised due diligence to render the tank in which the oil was carried seaworthy, held that in computing the value of the depreciated oil delivered to the consignee, multiplication of the number of gallons of pure oil shipped by the estimated value of the oil per gallon was error; the correct theory of calculation was to multiply by the estimated value of oil per gallon the number of gallons of mixed oil and water on which the estimated value of oil per gallon the number of gallons of mixed oil and water on which the estimated value per gallon had been based by a qualified witness.

* * *

AWARD of $68,600 for salvaging a cargo of coffee worth $343,000, in a stranded steamship, was held, in the case of Huasteca Petroleum Co., v. 27,907 bags of coffee, 60 F. (2d) 907, to be excessive by $38,600. The testimony showed that the steamship stranded on Gallequilla reef while entering the harbor of Vera Cruz, Mexico, that the salvage contract was on a "no cure, no pay" basis, that the cargo had to be lightered, and that the work continued from Sept. 24 to Oct. 6. There was some rough, but no seriously dangerous, wind or sea. The service required skill, experience, and the promptitude, and was efficiently rendered. It did not demand fortitude on the part of the masters or crews engaged in the enterprise or involve any particular hardships. Skill, energy, and a complete and costly equipment consisting of two large and powerfully equipped salvage steamers, a motor launch, and nine lighters, were the main things required and supplied. Under all the circumstances, $30,000 was considered a sufficient award.

* * *

ONE employed on a vessel which was registered under the law of Honduras, never documented under the laws of any other country, carrying the Honduras flag, and owned by one American citizen and operated by another American citizen under a demise charter, was a "seaman" entitled to sue under the Jones act for injuries occurring on the high seas. The treaty of Honduras with the United States respecting internal disorder or discipline on a vessel of Honduran registry does not affect the right of a seaman to recover for negligence against an American citizen owning the vessel. Congress has power to impose liability upon its own citizens for acts done upon the high seas or at other places outside its territorial jurisdiction.—Gerradin v. United Fruit Co., 60 F. (2d) 927.

* * *

WHARFINGER, who was also consignee, though not an insurer, had the duty to use ordinary care to see that the berth into which a loaded scow was placed was reasonably safe and free from anything that would be dangerous to the scow, or, at least to give due notice of the existence of such dangers so that they might be avoided. The master of the scow had the right to assume that the berth was clear of stones, and if there existed a rock or boulder or similar obstructions of such character as to damage the bottom of the scow, the berth was unsafe, and the wharfinger was required to use reasonable care to ascertain, before placing the scow, whether or not there was such an obstruction and show that it had examined or had made reasonable efforts to ascertain whether such obstruction existed.—Kenny v. Venetian Contracting Co., 60 F. (2d) 1053.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	237	1,373,856	236	1,380,867
January	254	1.416,857	245	1,383,630
December	244	1,307,332	253	1,387,341
November	227	1,154,961	232	1,175,988
October	253	1,379,283	244	1,328,561
September	258	1,634,448	266	1,658,521
August	287	1,754,583	270	1,636,803
July	238	1,483,476	254	1,553,215
June	267	1,579,970	277	1,650,915
May, 1932	277	1,484,116	259	1,392,451

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	38	105,262	20	56.395
January	53	154,823	41	142,216
December	44	141,426	37	116,120
November	54	154,796	41	130,250
October	57	167,539	42	115,660
September	45	123,049	36	99,766
August	64	175,530	43	113,901
July	49	130,439	38	85,956
June	55	157,399	36	102,354
May, 1932	66	205,184	46	142,889

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	83	285,162	53	191,084
January	97	329,575	56	211,428
December	98	300,132	64	241,693
November	88	308,164	59	220,530
October	99	332,754	68	249,150
September	114	337,608	91	283,227
August	117	369,799	103	339,775
July	121	408,896	101	346,926
June	116	342,057	95	322,558
May, 1932	125	294,093	97	257,608

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	19	52,001	19	48,913
January	14	35,038	13	34,153
December	17	43,705	16	40,396
November	7	9,785	6	10,174
October	8	21,407	7	18,228
September	9	14,698	9	16,526
August	14	25,844	14	24,208
July	9	15,156	10	17,733
June	10	25,895	11	26,519
May, 1932	14	26,484	14	29,669

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	7	27,520	1	4,393
January	2	7,473	1	3,171
December	3	7,918	2	8,820
November	4	13,673	3	11,066
October	3	13,133	3	9,683
September	3	11,450	4	14,471
August	5	13,418	1	5,071
July	2	5,918	2	9,634
June	7	22,359	3	7,151
May, 1932	7	24,204	....	.....

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1933	24	95,271	33	138,372
December	22	92,267	41	166,858
November	19	78,628	41	157,544
October	25	98,792	45	182,167
September	25	98,370	37	146,945
August	22	93,256	32	127,572
July	21	84,961	24	99,035
June	20	80,272	25	98,356
May	20	82,750	25	99,862
April, 1932	23	83,171	28	104,796

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	63	195,299	75	226,672
January	77	247,903	78	252,052
December	75	238,598	68	224,544
November	80	254,047	83	262,796
October	98	281,907	94	281,534
September	66	190,459	80	241,287
August	88	243,077	87	245,091
July	88	255,354	86	255,209
June	95	299,502	97	294,264
May	95	289,042	102	317,751
April, 1932	108	346,276	114	377,317

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	16	49,213	36	82,544
January	20	58,470	33	76,493
December	28	77,286	38	92,621
November	20	54,678	35	79,516
October	15	60,775	36	80,792
September	26	74,483	53	118,437
August	25	53,025	37	86,952
July	23	72,755	36	91,332
June	18	51,803	48	114,222
May, 1932	24	52,049	43	112,672

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	6	15,126	7	13,454
January	3	4,683	8	21,018
December	10	24,067	10	24,595
November	10	24,352	2	1,799
October	8	16,714	8	13,659
September	7	15,879	7	12,539
August	8	14,142	9	16,647
July	8	20,558	7	16,963
June	7	12,746	10	20,277
May, 1932	12	33,157	8	20,489

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	37	52,615	34	49,320
January	38	55,322	38	54,692
December	38	59,058	39	58,604
November	37	64,384	37	61,961
October	35	62,394	35	62,394
September	36	60,309	36	61,405
August	37	66,432	37	66,313
July	38	62,503	40	62,486
June	37	61,115	39	76,274
May, 1932	56	76,236	55	76,070

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	80	184,669	83	200,850
January	100	232,451	91	201,671
December	86	204,295	92	209,061
November	94	210,195	97	234,590
October	105	228,041	105	233,510
September	89	166,896	96	193,213
August	90	196,453	88	188,375
July	107	222,810	99	203,444
June	91	207,178	93	201,443
May, 1932	102	212,215	97	198,871

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	43	196,979	43	190,338
January	50	212,954	49	210,083
December	45	202,731	47	207,521
November	43	193,530	45	200,513
October	53	235,224	58	251,334
September	40	168,740	40	175,635
August	39	183,141	36	167,807
July	32	145,560	36	162,923
June	36	160,585	32	143,574
May, 1932	43	184,393	41	170,652

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	128	378,040	127	366,948
January	135	307,750	145	410,412
December	151	434,935	157	450,545
November	146	442,427	156	457,621
October	140	403,062	150	424,621
September	151	423,791	139	415,704
August	160	448,826	156	442,655
July	166	438,496	171	448,198
June	170	597,552	164	457,960
May	182	517,523	169	472,154
April, 1932	192	558,631	194	559,824

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	24	65,228	24	65,218
January	28	83.545	23	65,063
December	24	58,943	24	63,086
November	33	93,457	30	85,072
October	14	33,693	12	34,625
September	21	54,638	20	52,035
August	15	29,293	18	46,756
July	17	39,628	14	39,844
June	26	80,438	25	78,864
May, 1932	29	80,415	27	71,288

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	17	29,935	69	200,485
January	23	43,723	79	235,748
December	24	39,491	103	311,999
November	29	64,016	102	314,452
October	26	54,231	94	277,977
September	25	38,083	85	236,532
August	29	44,389	71	202,598
July	27	50,302	79	220,489
June	28	47,046	81	226,542
May	38	84,468	86	259,026
April, 1932	44	97,609	106	297,282

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	143	528,613	155	543,628
January	162	633 944	169	668,576
December	152	538,392	156	560,901
November	194	645,826	195	662,569
October	209	641,131	201	657,641
September	223	581,402	222	610,443
August	253	653,836	244	635,164
July	226	646,417	230	617,947
June	168	588,184	162	558,945
May, 1932	229	691,109	164	650,539

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1932	145	658,005	144	621,439
January	154	672,230	147	657,934
December	135	608,843	170	579,362
November	154	672,184	152	655,379
October	147	669.637	166	727,969
September	136	608,268	153	667,866
August	152	640,952	162	702,483
July	148	687,695	142	655,436
June	133	588,465	132	590,158
May, 1932	154	669,735	152	649,509

Houston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
February, 1933	20	71,711	28	95,755
January	19	72,798	33	110,421
December	13	45,319	30	95,323
November	22	86,895	28	106,050
October	21	81,274	37	136,509
September	23	103,424	33	121,134
August	11	47,148	32	116,860
July	17	66,968	20	87,589
June	20	93,807	31	119,752
May, 1932	29	122,192	36	149,039

Note: The figures given in this table are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 60 of 203,964 net tons entered and 58 of 200,302 net tons cleared for the month of February.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

THE PETEN, latest of six new passenger and cargo liners for the United Mail Steamship Co., a subsidiary of the United Fruit Co., sailed from New York at 4 p.m., March 2 on her maiden voyage to the Caribbean with a big passenger list. This vessel, like two of her sister ships, the TALAMANCA and CHIRIQUI, was built by the Newport News Shipbuilding & Dry Dock Co., she was delivered to the owner Feb. 24.

An event unusual in maritime affairs took place after the liner was one hour out at sea when Capt. Harry A. Spencer, master of the vessel, released two homing pigeons with a message from the ship's officers and passengers addessed to the then Pesident-elect Franklin D. Roosevelt and rushed to him at Washington over a direct signal corps wire. The message read:

"The United Fruit liner PETEN, latest addition to the new American merchant marine, is now on her maiden voyage. From her bridge I am releasing homing pigeons carrying to you, from the passengers and officers, this message of congratulations as you embark on your maiden voyage as President of the United States. We bid you God speed. May all success and prosperity attend you Harry A. Spencer, Master."

The PETEN like her five sister vessels is of 10,000 tons, with a speed in excess of 18 knots, and has accommodations for more than 100 first class passengers, all in outside staterooms. Particulars and illustrations of this class of outstanding modern vessels will be found in the distinctive ship section of this issue, page 17.

Washington Sea Trials

The new liner WASHINGTON, sister ship of the MANHATTAN, built by the New York Shipbuilding Co., Camden, N. J., for the United States Lines, is scheduled to commence her builder's sea trials on April 25. When these trials have been satisfactorily completed, the plan is to bring her to New York where she will be dry docked at the Robins plant of the Todd Shipyards Corp., Brooklyn, N. Y., where her hull will be scraped and painted, and superstructure given a final coat of paint.

She is scheduled to sail on her maiden voyage from New York on May 11 in command of Capt. George Fried, now master of the MANHATTAN. In the interval between the completion of her drydocking and date of sailing, the finishing of her decoration wil be carried out and steward's department, stores and equipment will be placed on board.

Together with the MANHATTAN, the WASHINGTON will operate in the service of the United States lines between New York and Cobh, Plymouth, Havre, Hamburg, and Southampton.

Mail Contract Awarded

Though the sale of 52 United States shipping board ships to the Lykes-Bros. Ripley Steamship Co. Inc., New Orleans for approximately $2,461,790 really had its inception in April, a year ago when an offer for these ships was made by the operator its consummation has now become a fact through the announcement by the post office department Feb. 28, that a contract had been awarded this company for carrying United States mail from two Gulf ports to the Bitish isles and Europe and from Galveston to Pacific and trans-Pacific ports.

This mail contract provides for payment of $2,500,000 for the first years with increased compensation as building requirements are met by the company. It runs for ten years and calls for a total expenditure for new ships and reconditioning others during this period of around $23,000,000.

Specifically the route runs from New Orleans, Houston or Galveston to ports in northern continental Europe, the British Isles and ports on the Mediterranean, Adriatic, Black sea and adjacent waters and from Galveston to Pacific and trans-Pacific ports.

The contract for the sale of this fleet of 52 ships averages approximately $5 a ton "as is, where is." The down payment is 25 per cent or $615,447 in cash, with the balance payable over seven and a half years. It is estimated in official circles that under this arrangement of compensation through mail contracts the government will save over $1,400,000 annually as compared with the former cost to the government of the same service.

Mail Contract Deferred

Because of opposition in the United States senate, the ocean mail contract for the Philadelphia Mail Steamship line was held in abeyance by former postmaster general Walter F. Brown.

The matter of this mail contract and mail contracts from other Atlantic ports will now be up to the new administration.

Floating Dry Dock Ordered

Dravo Contracting Co., Neville Island, Pittsburgh, was announced low bidder March 9 on a large floating dry dock for the United States navy. Delivery is to be made ultimately to San Diego, Calif., but the government will accept the builders' delivery at any one of several eastern ports. The dry dock will be 361 x 60 x 34 feet and is expected to require in the neighborhood of 2000 tons of steel plates and other steel products. The Dravo Contracting Co.'s base bid was $278,200, or approximately $81,000 under the second bid which was by the Pusey & Jones Corp., Wilmington, Del., whereas the high bid was $522,195 by the Berg Shipbuilding Co., Seattle.

Notice to Lake Mariners

The United States district engineer at Detroit has announced that on or about March 27 it is expected dredging operations will be begun for improvement of Fighting Island channel, Detroit river, the work to be completed on or before Aug. 15. During this period the hydraulic dredge SHAMROCK will be operated in several shoal areas on both sides of the channel. Operations during the months of April and May will probably be confined to the easterly 300-foot width of the channel, extending about 5000 feet north from the Fighting Island's south light.

Vessels navigating the Detroit river will be required to pass the above plant while in operation and should proceed with caution.

Steel Oil Barge Bids

The United States engineers office, Vicksburg, Miss., on Feb. 24 opened bids for the construction and delivery afloat at Vicksburg, of one 120 x 30 x 7 feet steel oil barge.

The low bid of $10,850 was submitted by the Dravo Contracting Co. Nine other bids varied from a low of $11,950 submited by the Midland Barge Co. to the high bid of $15,189 submitted by Chas. Hegewald Corp.

Queen of Bermuda Sails on Maiden Voyage

The QUEEN OF BERMUDA, second new turbine electric luxury liner to be completed in the Furness-Bermuda line's $16,000,000 shipbuilding program for deluxe passenger service between New York and Bermuda, was given a rousing welcome on her arrival at New York March 3.

She sailed on her maiden voyage from New York to Bermuda on March 7 and it was reported that all passenger accommodations were taken and that a number of people had to be turned away.

The QUEEN OF BERMUDA with the MONARCH OF BERMUDA will maintain regular, twice a week, sailings in each direction, the QUEEN OF BERMUDA sailing on Saturday from New York and the MONARCH sailing on Wednesday.

The QUEEN OF BERMUDA is of fine proportions and presents a pleasing appearance. She is 580 feet in length and 77 feet in beam. Her gross tonnage is 22,480 and she has excellent accommodations for 750 passengers in the first class and 30 in the second class.

Propulsion is by turbine electric drive developing a total of 19,000 horsepower, applied by electric motors to four propellers. Her cruising speed is 20 knots. An outstanding feature of electric drive in addition to economy of operation and cleanliness is the complete elimination of vibration. So silently and smoothly is her large power developed and applied that passengers hardly realize that she is in motion.

The new liner was built by Vickers, Armstrong Ltd., at Barrow-in-Furness, England, for Furness Withy & Co. Her turbine electric machinery was built and installed by the General Electric Co. Ltd.

Her commander is Capt. H. Jeffries Davis.

Launch New U. S. Cruiser

The new, treaty cruiser, NEW ORLEANS, is scheduled for launching at the Brooklyn navy yard on April 12. The new vessel is one of the treaty cruisers and is of 10,000 displacement. Her cost is about $11,000,000.

She will carry a battery of nine 8-inch guns, eight 5-inch guns, eight anti-aircraft guns, and six 21-inch torpedo tubes, and will have a speed of about 32 knots. Deck space has been arranged for four airplanes to be launched by catapults.

Barge Building Prospects

More than at any other time in approximately the past year, buying of Ohio river barges appears more favorable. Prospects are especially encouraging for barge purchases from leading oil and gasoline companies in the upper Ohio river district from Cincinnati to Pittsburgh. Many oil companies are seeking barges already constructed and finding a lack of available hulls have been inquiring briskly for their requirements in new barges.

Recent barge buying on the Ohio river of private sponsorship includes six large cargo barges for the Barrett Lines, Cincinnati, and three coal barges for the Costanzo Coal Co., Wheeling, W. Va. In addition, considerable government work in tank barges, pontoons and pipe sections has been active.

Build Dredge, Drill Boat

Merritt Chapman & Whitney Corp., Superior, Wis., announces construction of an all steel dredge and all steel drill boats at the local plant. This company is a subsidiary of the Merritt Chapman & Scott Corp., New York. Both vessels, which are for an eastern dredge company, are to be ready to go down the lakes by about May 15. Work is being rushed with a maximum of 250 men working daily and at times in three shifts. It is estimated that at least $30,000 will be spent for labor during the construction work.

The dredge is to be 126 feet long, 42 feet in beam and 12.6 feet deep. The drill boat equipped with special drills for drilling rock formations will have a length of 100 feet, a beam of 36 feet, and will be 7 feet deep.

Santa Elena is Completed And Enters Service

The Grace Line program of building four 17,000-ton passenger and cargo liners is completed with the scheduled sailing of the SANTA ELENA from New York on March 31.

These splendid vessels were built by the Federal Shipbuilding & Dry Dock Co., Kearny, N. J. A fully illustrated article on the SANTA ROSA, first of these four liners, was published in the December 1932 MARINE REVIEW. Particulars on this class of vessel also appear in the distinctive ship section of this issue, page 16.

On her sea trials, the SANTA ELENA made a speed of 21½ knots, more than a knot over the contract speed requirement.

In a recent statement, Daulton Mann, executive vice president of the Grace line said in part:

"The sailing of the SANTA ELENA will enable us to maintain a weekly service to California and the Pacific Northwest; with seven calls at Ports in Spanish Americas. The SANTA ROSA and her sister ships, SANTA PAULA, SANTA LUCIA and SANTA ELENA will make the run between New York and California in 16 days.

"We are deeply grateful for the way the traveling public has accepted the SANTA ROSA and her sister ships. Each ship since entering service has sailed from East and West coast terminals with capacity bookings."

The merchant marine act of 1928, popularly known as the Jones-White law, made possible the building of these fine new Grace liners. They were designed by Gibbs & Cox Inc., New York naval architects.

Order Stock Oil Barge

Dravo Contracting Co., Pittsburgh, will supply a stock barge, 170 x 40 x11 feet for the Texas Oil Co., New York, to be used in the transportation of gasoline in the Eastern coastwise trade. The barge has a capacity of 10,000 gallons and is being delivered from the Wilmington, Del., yard of the Dravo company.

Bunker Prices

At New York

	Coal Alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Mar. 18, 1933	4.30@4.60	.80	4.08
Feb. 18	4.30@4.60	.80	4.08
Jan. 17	4.50@5.00	.80	4.08
Dec. 16	4.50@4.75	.80	4.75
Nov. 18	4.50@4.75	.80	4.08
Oct. 18	4.50@5.00	.80	4.08
Sept. 18	4.50@5.00	.80	4.08
Aug. 18	4.50@5.00	.90	4.08
July 18	4.50@5.00	.90	4.04½
June 18	4.50@5.00	.80	3.70
May 18, 1932	4.50@5.00	.75	3.70

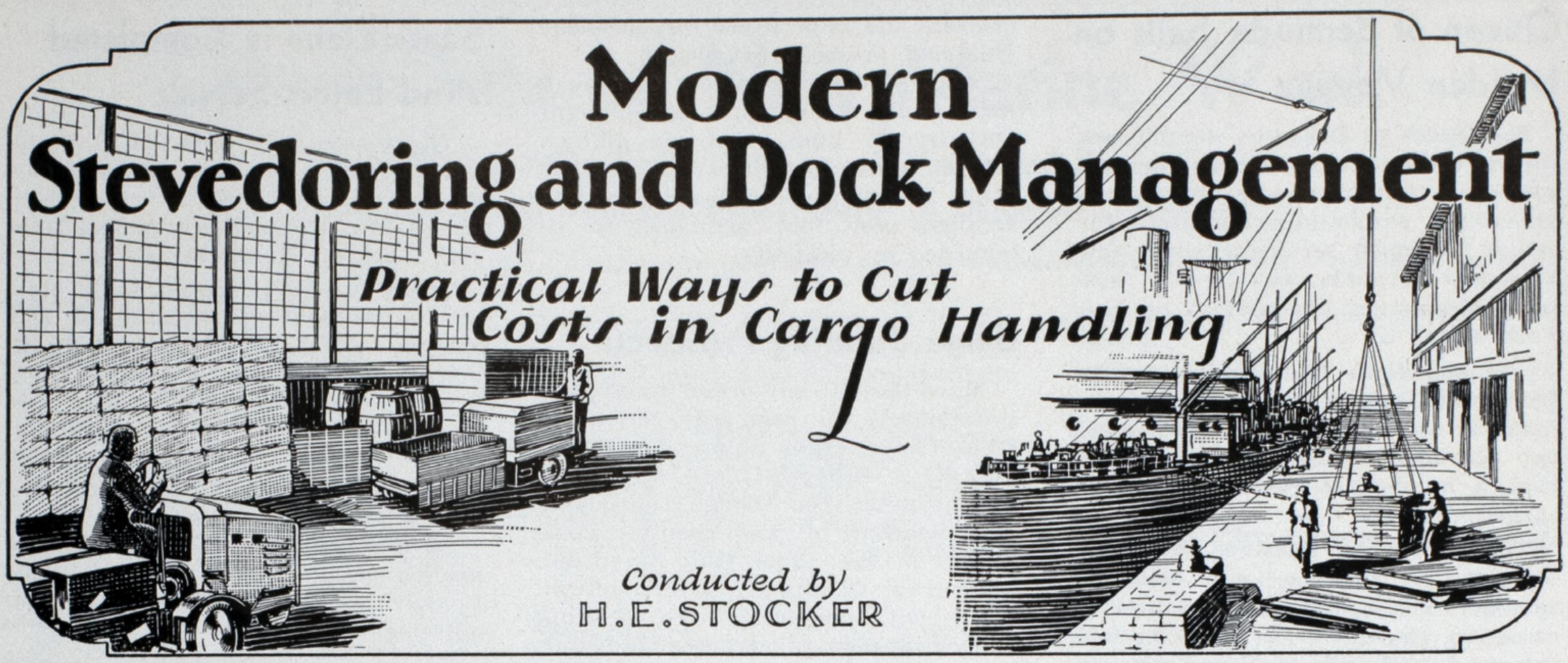
At Philadelphia

	Coal trim in bunk per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Mar. 18, 1933	4.30@4.60	.80	4.04
Feb. 18	4.30@4.60	.80	4.04
Jan. 17	4.50@5.00	.80	4.04
Dec. 16	4.00@4.75	.80	4.04
Nov. 18	4.00@4.75	.80	4.04
Oct. 18	4.50@5.00	.80	4.04
Sept. 18	4.50@5.00	.80	4.04
Aug. 18	4.50@5.00	.90	4.04
July 18	4.50@5.00	.90	4.08
June 18	4.50@5.00	.80	3.69
May 18, 1932	4.50@5.00	.80	3.69

Other Ports

March 18, 1933

Boston, coal, per ton	$7.45
Boston, oil, f. a. s. per barrel	$0.73½
Hampton Roads, coal, per ton, f.o.b. piers	$4.25 to $4.50
Cardiff, coal, per ton	14s 0d
London, coal, per ton	—s —d
Antwerp, coal, per ton	16s 9d
Antwerp, Fuel oil, per ton	67s 6d
Antwerp, Diesel oil, per ton	82s 6d
British ports, Fuel oil	67s 6d
British ports, Diesel oil	82s 6d



Economies Effected by Skid Shipments Point Way to Other Savings

By H. E. Stocker

CO-OPERATION of all those interested in transportation is so practical and profitable, that it is worth the attention of men who are harassed by the problem of keeping their business or their jobs, from financial disaster. Co-operative effort by railroads, shipping men, roadway transport men, cargo handling equipment manufacturers and the shipping public, can be developed along lines which will prove immediately profitable. Many profitable co-operative efforts are possible. Some of these have become a reality; others are gradually developing into reality.

Successful From Beginning

Several years ago, a steamship man suggested to a large paper manufacturer that he ship his paper to the Pacific coast on skid platforms. He said "You are the first steamship man who has shown any sense." It was not good sense, however, that prompted the suggestion. It was based on acquired knowledge of the great economies and other advantages that resulted in handling paper on skids between inland points and on Coastwise steamship lines. Due to what might be termed "organization friction" it took many months before the idea became a reality. Methods of handling skids into and out of a ship were devised. The men on the piers had to be instructed in the new method of skid shipping and their co-operation obtained, so that the plan would function satisfactorily.

The first shipment was 100 per cent successful and a new method of handling freight became effective which benefited everyone concerned.

Handling paper on skids from eastern mills to publishing houses on the Pacific coast is an interesting operation in distribution. Skids and lift trucks, both hand and power, are used under varying conditions and the method illustrates the wide distribution of reduced cost to all handling the skids.

At the mill the paper comes from the cutting machine on to a skid which is suspended to the proper level by a hoisting device. As the weight of the paper increases the skid lowers until, with full load, the legs of the skid are on the floor. The load from the cutting machine is moved by a hand lift truck to the finishing room where the paper is placed by hand on the skid to be used for shipping. It is then wrapped and covered with water-proof paper. Strips of wood are fitted on the corners and on the top and the load is secured to the skid with steel strapping. An electric truck is used to haul it to storage, or direct into the box cars at the loading platform. The skids are well braced in the car to prevent shifting and damage to the paper. A power truck is needed for this operation because of the long hauling distance.

On arrival at New York, the car is switched to a depressed track on the railroad's lighterage pier. The skids are unloaded by electric lift trucks. If orders have been received by the steamship companies, the skids are taken directly to lighters, if not they are placed on the dock awaiting orders. "Cut gangways" are provided at frequent intervals on both sides of the pier to facilitate loading the lighters under varying tidal conditions. If the ramp is steep, due to the tidal line, the truck is backed down so that the wall of the battery compartment keeps the load from sliding off the lifting platform.

Saving in Handling

The railroad saves four handlings when paper moves on skids as compared with paper moving in cases, while additional handling is avoided by handling a less number of units every time the carload is moved.

At the steamship pier, the lighter is held for direct loading into the ship to avoid rehandling on the dock.

The skids underneath the hatchway of lighters are taken out by the ship's gear. The remainder of the skids are brought to the hatchway of the lighter by a hand lift truck. If the truck available is of a low clearance height, planks are placed on the truck to get the necessary lift. The gear is a simple bridle sling fitted with loops at the four ends which fit around two pieces of 2 or 3-inch pipe or a board in place of the pipe. The large size pipe is not satisfactory because it is apt to jam against the deck or dunnage on the deck, making it necessary to move the skid to release the bridle.

At the top of the skid, spreaders are commonly used to prevent the wire cable from damaging the paper.

When possible, the skids are placed in the square of the hatch to avoid rehandling in the hold. If this stowage is not possible, the skids are pulled into the wings with a hand lift truck. The loading completed, the skids are shored off by the carpenter or blocked solid with other cargo of a nature that will not damage the paper with sharp edges. Tires, which give off analine oil fumes and discolor paper, oil soaked cargo, greasy pipe or steel, etc., are kept away from the skids. If space is at a premium either because the ship is full or because the space available for a certain port of discharge is limited, the skids are covered with a light cargo.

Skids are usually 8 to 12 inches high. This causes loss of space in stowing but this is more than offset by the greater density of the skid load as compared to a shipment of paper in cases.

Saving to Steamship Company

Shipping on skids results in important economies in operating costs to the shipping companies. First the slingload is increased about 200 per cent. The usual slingload of paper in cases consists of two cases weighing approximately 600 pounds each. The average skid weight of paper is 3600 pounds. One steamer had a number of skids weighing between 4800 and 4900 pounds each. This heavier slingload tends to cut cargo handling costs and speed up ship's dispatch. Checking and sorting is cheaper because of the lesser number of units per ton of freight carried.

Claims are reduced in spite of the fact that most of the skids are protected by only a paper covering. This is probably due to the fact that the heavier skid unit cannot be pushed on its side and otherwise knocked around without causing the longshoremen additional work and trouble.

Cases should be stowed on the flat but stevedores can easily ignore this and often do. However, skids are only stowed one way.

When moving via the rail river route to New York, shipments arrive at the terminal of the Hudson River lines up the river, where they are taken aboard through the side ports of the river boats with hand lift trucks. On arrival at New York, the skids are taken from the ship by hand lift truck hauled by an electric tractor. The tractor is used because the skids are hauled a long distance to a bulkhead at the head of the dock where they are loaded on to motor trucks. The skids are taken to the pier of the steamship company and unloaded by means of a hand lift truck working in conjunction with a portable ramp and the street truck's winch.

When the steamer is ready to load the skids, a hand truck is used to carry them to ship's side where they are slung overside, in the same manner that they are handled from lighters.

After arrival at a Pacific coast port, San Francisco, for example, the loading operation is reversed. The paper is hauled away from ship's side with a hand lift truck and placed in temporary storage on the dock until called for by consignee's truck. The skids are then pulled on to the truck with a winch, a lift truck and a portable ramp. The low body lift trucks in use on the Pacific coast are helpful in this operation, and in unloading at consignee's plant.

When the shipments are forwarded by rail the car is loaded and unloaded with a hand lift truck.

Economies for all Concerned

At the consignee's plant the paper is placed in storage until needed in the press. Some publishing plants pile the skids three high by means of an overhead hoist. Others pile the skids two high with a portable elevator. The paper is taken to the press by lift trucks and then placed in a machine which lifts the skid so that the paper feeds into the machine directly from the skid. The skid is raised as the paper is fed into the press operating in conjunction with a feeder.

In some plants, skids do not feed directly to the machine. The paper is picked up by hand and placed on the press. Printed paper comes out of the press on to skids and is hauled to other points in the plant in that manner.

The skid method effects big economies for all the various transportation and other interests involved.

The manufacturers reduce handling and packing expenses and freight charges are less because there is less freight paid on packing material. The rail line gets its cars loaded and unloaded quicker, which increases the car miles per year. At the lighter pier in New York the cars are unloaded with less labor cost, claims are reduced and lighters are tied up for shorter periods.

The steamship lines save in less stevedoring expense, expediting ship's dispatch and less claims. The truckman at San Francisco loads and unloads his trucks quicker. The publisher, or other printing establishments, reduces handling expenses not only in moving paper out of the freight car and in and about the plant, but in reducing the amount of boxes and wrapping paper that must be disposed of as compared with shipments in cases. There is also less labor per unit of paper in unpacking a skid as compared with a case.

This co-operation of the steamship company with the paper manufacturer extended an economical method of shipping paper to the intercoastal water route, after this method had been developed for land transport by the co-operative efforts of railroad men, truckmen and other interested parties.

A Program of Co-operation

A comprehensive program of co-operation between all interested in transportation, can be drafted easily. This does not wait upon technical developments or upon new methods and equipment but upon leadership which can co-ordinate the efforts of the human beings involved in the program and make full use of well proven methods.

The difficult problem is overcoming the organization "friction" which prevents the effective use of suitable equipment and established methods.

The human factor is the most important factor and therefore is given the major attention by the most successful companies. If the human factor is brought under control, other factors take care of themselves.

History also discloses that the highest type of leadership is rare so that we must utilize leaders who are trained for their work in light of the accumulated knowledge of organization management, and are instructed in the technical knowledge of their field of activity. There are not only well established principles and methods of handling and shipping freight, but there are equally well established principles and methods of managing the organization, without which the best freight handling methods lose most of their value.

Perfection is not expected in any organization because the human element is not perfect, but great improvement is possible by utilizing available knowledge on management.

The economies of the skid method of shipping cannot be availed of without the co-operation of railroads and shipping men, truckmen, warehousemen, shippers and consignees, as well as the manufacturers of materials handling equipment.

After the practicability of handling paper on skids to the Pacific coast was established, the next step was to extend the skid method of freight handling, to other varieties of freight.

Handling fire brick loose from Pittsburgh to the Pacific coast was uneconomical because it was handled 14 times, and the brick was seriously damaged. It seemed ridiculous to manufacture excellent fire brick and then start breaking it up almost as soon as it was manufactured.

The simplest approach to this problem was to place the brick on skids at the time of unloading from the cars at Baltimore. The intelligent co-operation of a steel strapping manufacture was obtained and

fire brick was shipped in units of 5000 to a skid load instead of being handled brick by brick.

The brick arrived at destination with a minimum damage, so the steamship company cut its stevedoring costs 40 per cent and increased the tons handled per hatch hour from 7.5 tons to 39 tons. The most striking evidence of the inefficiency of the old method which was inherited from the Phoenicians, the leading shipping men some 2000 years ago, was that the 40 per cent a ton reduction in stevedoring costs was obtained in spite of the fact that the steamship company furnished the skids free and gave them to the consignee at destination.

Shipping soapstone furnace blocks on skids from Virginia to the Northwest, saved the consignee $4.00 on freight charges, delivered the blocks in first class condition and saved handling expenses in relining the furnaces at the paper mills. The stone was handled into the furnace on skids, 5000 in a unit rather than in units of one block.

Everyone who co-operated in making this idea a reality benefited.

Minimum Damage to Brick

The practicability of the skid method of handling fire brick having been established, the idea of using it in the export trade was developed. One shipment of firebrick consist.ng of 80,000 bricks arrived at destination with less than 2.5 per cent chipped or broken. Formerly, when the brick was crated in units of 50 bricks, breakage ran as high as 35 per cent.

The development of the skid idea described was possible because the steamship company in which the idea originated gave one of their executives the time necessary for this development work.

Lack of time to carry on work of this character is the greatest obstacle to progress. In most transportation organizations, freight handling occupies only part of the time of a responsible executive.

The employment of a properly trained man for supervision of cargo handling is justified by the direct results obtainable.

Such a man can more than pay his way either by reduction of handling costs, by reduction of claims, or by obtaining additional business for the company by claims reductions and improved service. He can do much to bring about greater co-operation between the operating and traffic department to the end that costs are reduced and traffic increased. Even in a small line, a reduction of costs by $5,000 a year would be only 2 or 3 per cent of the cost per ton. The full time attention of a trained man to his job would get such a reduction in any company. I know few companies where such a man is already at work; these can be counted on the fingers on one hand.

Five or six additional carloads a year would pay his way. There is no reason why he should not do both so that for each dollar expended on this man, the company would make a dollar. Probably he would earn two or three dollars profit for each dollar expended. Such a profit ratio is good business at any time. It is especially good business now.

Groups such as the American Society of Mechanical Engineers and the Society of Naval Architects and Marine Engineers, the Society of Terminal Engineers and the American Railway association, are all needed in developing more effective transportation industry. Interchanging knowledge and stimulating thought is a valuable means to this end. Their efforts can be co-ordinated profitably by an Institute of Transport, a central body which will emphasize the essential unity of all transportation and by increasing the interchange of new ideas and information, stimulates the creation of a progressive point of view, which will lead the industry to profit and to a greater service to trade and industry.

February Lake Levels

The United States Lake survey reports the monthly mean stages of the Great Lakes for the month of February as follows:

Lakes	Feet above mean sea level
Superior	601.95
Michigan-Huron	577.59
St. Clair	572.89
Erie	570.60
Ontario	244.28

Lake Superior was 0.12 foot lower than in January and it was 0.15 foot lower than the February stage of a year ago.

Lakes Michigan-Huron were 0.01 foot lower than in January and they were 0.61 foot lower than the February stage of a year ago.

Lake Erie was 0.08 foot lower than in January and it was 0.89 foot lower than the February stage of a year ago.

Lake Ontario was 0.01 foot lower than in January and it was 0.77 foot lower than the February stage of a year ago, 0.91 foot below the average stage of February of the last ten years.

Captain Stedman Honored

On Mar. 7 the American Bureau of Shipping through J. Lewis Luckenbach, its president, awarded the valor medal to Capt. Giles C. Stedman, now staff captain of the LEVIATHAN and former master of the AMERICAN MERCHANT, for the rescue in mid-Atlantic on Jan. 20 of 22 men from the sinking freighter EXETER CITY.

The presentation was made following a luncheon at India house, 1 Hanover Square, New York City. In attendance were officials of the bureau and many executives of shipping companies. This solid gold medal which was initiated by the late Capt. Charles A. McAllister has been awarded only once before, in 1929, to Capt. George Fried.

In accepting the medal and citation, Captain Stedman said that he did so as a representative of the officers and crew of his ship. He said:

"I wish to reiterate my frequently expressed thought that a rescue at sea is purely a matter of opportunity. If a ship happens to be in the vicinity of the vessel in distress, it gets the job—another could do equally well. The one thing proved by the EXETER CITY affair is that the crew of a wreck may be removed under difficult sea conditions without needlessly exposing the men on the rescuing ship.

"Mr. Luckenbach is well aware of my feelings today as I stand here honored by a society which had the wholehearted interest and affection of a man whose friendship was dear to me. At this time I am proud as a member of the seafaring fraternity to pay loyal tribute to the memory of that mighty leader of American shipping, the late Capt. Charles A. McAllister."

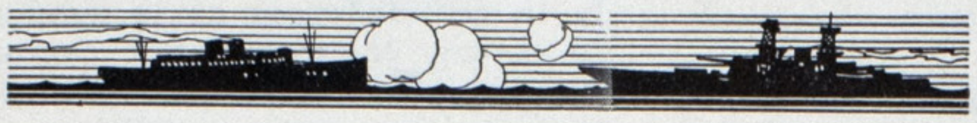
Captain Stedman has also received the medal of honor of the city of New York and the plaque of honor of the British board of trade. He was also honored by civic receptions at Boston and in his native town of Quincy, Mass. At 36, he is one of the youngest of American shipmasters. In further recognition of his services he was appointed staff captain of the LEVIATHAN and sailed in this capacity from New York on Mar. 8.

L'Atlantique Insurance

Though it may have been settled by this time a dispute is said to have arisen between the owner of the 42,000-ton French liner L'ATLANTIQUE, severely damaged by fire in the English channel, and those who held insurance on her.

The total insurance is said to be approximately $6,800,000 held by British, French and American companies. The French claim is that the repairs would amount to £2,300,000 and that since the total insurance is less than this amount that they have the right to surrender the wreck to the insurance companies. Lloyds representatives of the insurance brokers claim that the vessel could be rebuilt in English shipyards for less than this and refuse acceptance of the ship or to pay insurance on this basis. They offer instead to repair the vessel. It is expected that a satisfactory compromise will be worked out.

Useful Hints on Cargo Handling



THE woodpulp handling operation begins in the hold of the ship which has brought the freight from the Baltic or from the Pacific coast. A chain sling is used with the exception of high grade woodpulp, which is handled from the ship with a rope sling with rubber hose protectors, to prevent the rope cutting into the bale. Grabs, with flat contact points, are used for handling Pacific coast pulp to prevent driving the bale wrapping into the pulp. When this is done, the wrapping paper discolors the finished paper. The Pacific coast pulp must be piled with flaps down, as a further means of preventing damage.

Three bales are hoisted to the dock in each sling load, using the ships booms and winches. The bales are hoisted to the wharf apron and then trucked a short distance into the shed where they are dropped onto the floor on edge. Due to labor regulations at Portland similar to those at some other ports, the ships stevedores handle he freight from ship to the designed spot in the shed and railroad labor performs the remainder of the work. The stevedores get 75 cents an hour and the other labor 55 cents an hour. The difference is due to the difference in continuity of the work, skill and danger involved. The bales are placed in sections with gangways in between for the trucks and for the maneuvering necessary in the next step of the operation; piling the bales in chisel truck loads.

Piling Machine Is Used

The piling is performed by a well designed machine developed by the Portland Terminal Co., and constructed by the Mead-Morrison Co. The chief effort was directed to obtaining a machine which would pile rapidly. This machine is capable of piling four bales a minute. The piler is a self propelled machine fitted with pneumatic tires and powered by motors driven by electricity received through a long cable. The cable is long enough to allow the machine to maneuver a distance equivalent to the width of the shed. An ample number of plugs are provided so that the whole shed area may be covered as required.

There are eight pilers at wharf No. 1 so that ample equipment is provided for rapid handling of the woodpulp. The loads are picked up by the chisel truck operator driving the chisel under the lower bale of the pile. To facilitate this, and to avoid damage, the man at the pile pries the load up a short distance with a bar. This utilizes the spare time of the pile men who must be at the pile to steady the bales as the chisel rises and tilts.

If the bales are ready to be loaded into a car on the depressed trucks at the rear of the shed, the truck operator proceeds directly to the designed car and drops his load. A helper is not necessary in the car as the truck operator simply lowers the chisel to the floor and backs away from the load. The loading of the car is planned so that the truck can maneuver with ease at all times. The first few loads are placed to the left of the car door against the side of the car; next, the end of the car is filled in solid, after which the remaining space at the other end of the car, is filled solid. Finally loads are placed in the doorway.

THIS page is being devoted to short items on all matters having to do with the more efficient turn-around of ships. These items are intended to be of a helpful nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.

Adopt Improved Methods

A STEAMSHIP company receives freight on a platform where it is floored. Shortly afterwards this freight is picked up and placed on trucks for handling into the ship. If the organization was trained, as it should be, in the fundamental principles of cargo handling, this wasteful re-handling of cargo would not exist.

An organization trained properly is more alert to detect uneconomical methods. Principles are tools to reduce the effort and the time necessary to accomplish a result. If $10,000 can be saved by a new method of handling cargo, $50,000 will be saved in five years.

If the organization is slow adopting the new method, the saving may be only $30,000. A thoroughly trained organization will be delayed the least in putting new methods into effect because it is the best informed about methods in use elsewhere. Also such an organization is always alert for new ideas, it has had experience in adopting new ideas to conditions and therefore time and wasted effort is reduced to the minimum.

Shipment of Latex

LATEX cannot be shipped in tanks where there is any trace of oil or dirt. It must never come in contact with brass, copper or galvanized sheets, etc.

Tanks must be absolutely air tight and any air vents must be permanently blanked off. The manholes must be provided with packing which will seal absolutely when bolted down.

Each tank must be provided with a safety valve, set for say 4 pounds per square inch.

Tanks which have had fuel oil in them should be steamed and thoroughly cleaned and covered with a coating of wax. Iron plugs should be put in the air vents and not wooden plugs.

West Coast Cargo Marks

IN INTERCOASTAL traffic, where the same vessel may have consignments of freight for a number of different ports, a system of cargo marks is used to identify cargo for each port. These cargo marks for Pacific coast westbound are as follows: San Diego, red cross in blue circle; Los Angeles, blue cross; San Francisco, red circle; Alameda, yellow triangle; Oakland, yellow cross; Oakland Twentieth street, green circle; Seattle, blue circle; Tacoma, blue cross in blue circle; Everett blue dash; Bellingham, green dash; and Vancouver green cross.

Take Care in Stowage

LACK of care in stowing cargo caused damage and mixing of marks when the pile in the ship fell over. It was a case of "this is only a short trip and the weather is fine." The ship sailed after discharging all the light cargo from the lower hold, leaving tinplate stacked twenty cases high. The boxes were stacked in rows by marks. The ship ran into severe weather; due to her light condition, she rolled a great deal. The pile of tinplate fell over causing breaking of the boxes and badly mixing marks. It required two gangs two days to separate the cases for correct discharge.

From the Editor's Mail

To the Editor

I have read with much interest the article in your October issue entitled *Suggestions for Better Ship Design*, in which the author discusses the possibility of increasing passenger traffic by changes in vessel construction which will make water travel more attractive to the traveling public. His criticisms and suggestions, I believe, are pertinent.

Anyone who is familiar with both will undoubtedly agree that passenger accommodations on lake overnight services suffer in comparison with those of similar services on the seacoast. Coastwise companies, in their postwar construction, have appropriated many of the comforts and luxuries of the modern transatlantic liner, with the result that the "night boat" out of New York or Boston, or a vessel on one of the slightly longer runs up or down the coast, offers interior arrangements which may be compared favorably with those of the most up-to-date hotel.

Adhering to an Old Pattern

Lake passenger boats, on the other hand, continue to adhere to the pattern of years ago. The persistence of the gallery deck arrangement and the absence of well furnished public rooms, where the passenger might forget weather conditions outside and feel the ease and security of a lounge ashore, are noticeable on the most recent of lake craft. Clean and neat, staunch and reliable, the better members of the lake passenger fleets may be; but it is questionable whether they deserve the description "palatial," so often applied in company literature—at least in the modern sense of the word as determined by present-day refinements in living conditions.

The newest of the lake Erie steamers, for instance, though supreme examples of their type, are not, from the passenger's standpoint, basically different from CITY OF DETROIT II of 1889, and no boat on Lake Michigan at the present time can offer a patron much more than could, say, the VIRGINIA in 1891. In contrast, compare the developments in railroad equipment in the last forty years, or, more striking, the progress in automobile luxuries in even the past ten years; likewise, the numerous betterments that distinguish the home or hostelry of today from that of the '80s or '90s. Or, on saltwater, note the tremendous advance of MANHATTAN upon ST. PAUL; of ACADIA and SAINT JOHN upon a sound or coastal steamship of a half-century back.

To the limited number, including myself, who enjoy water travel because it is water travel, irrespective of other features, the matter of the arrangement and furnishing of passenger quarters is perhaps unimportant. Indeed, we'd be inclined to prefer a ship that obviously is a ship to one that attempts to be a cross between a speedboat and the lobby of the Grand Hotel. However, for the great majority of travelers, on either business or pleasure, a water route is only one of several ways to the destination, and is to be chosen only if it satisfies the traveler's demands for speed, comfort, and reliability better than do the competitive services.

Making Boat Travel Attractive

The ship will always be slower, except where a natural cutoff gives an advantage. But cannot this handicap be more than offset by making marine transportation so comfortable, so luxurious, that it will become the ready preference of the average traveler? The Great Lakes are historically interesting and scenically attractive, and the lake boat, with its roominess and cleanliness, is potentially a more comfortable conveyance than a train, automobile or bus.

If, as the writer in the October MARINE REVIEW implies, the lake lines would make use of the fullest developments of marine architecture, following the practice of coastwise companies in ridding their ships of bareness and plainness and giving them the atmosphere of a cozy hotel, it should be possible to attract many a traveler who now considers lake travel archaic—attract him not only in summer, when weather conditions are most favorable, but during the many other months of the open season as well. A ship that by its meagerness of furnishings and its interior design constantly reminds the passenger that he is afloat is likely to prove very disagreeable in cold, rough and stormy weather. On the other hand, architecture and appointments such as characterize the best accommodations ashore can put the passenger at his ease and remove that feeling of insecurity which bad weather at sea brings to the average person.

I am not unmindful of the existence of certain operating conditions peculiar to the Great Lakes, nor am I unsympathetic with the difficulties that have beset lake lines in recent years. All-year service, for the most part (there are exceptions), is impossible because of ice, so that return on investment is generally limited to eight or nine months of the year at best; and where the run depends only upon resort or excursion traffic, the earning period is no more than two or three months. The automobile and motorbus have cut in upon the lake business, so seriously in certain cases as to send ships to lay-up or, worse, put companies into receivership or out of business. Current economic conditions have added to the problems.

Obsolete Equipment is Doomed

But no relief is likely to come so long as obsolete equipment is continued in use. It is almost certain that passenger traffic will not increase—rather it will go on decreasing—unless Great Lakes services are made more attractive. On the other hand, it is possible, though to be sure not certain, that changes in ship design as suggested in the MARINE REVIEW's article would more than pay for themselves in increased patronage.

The lakes are not carrying anywhere near the volume of passenger traffic they merit. The reason possibly may be found in the companies' adherence to the traditions of years past, their failure to provide accommodations comparable to those a person can find elsewhere. An attempt to remedy the condition may, it is true, be economically futile, in view of peculiar operating conditions. Certain coastwise managements, however, seem to have taken a correct step in bringing out new swift and luxurious equipment, and lake operators perhaps should consider the possibilities more thoroughly than they heretofore have.

John Fraser Roos

To the Editor:

Sometime ago I wrote you regarding the probable date of the launching of the first iron boat on the Lakes. If I remember correctly, you answered you had no record of it.

I have just read in an autobiography of Capt. Alex McDougall some facts that might interest you. I remember telling you that I went with a bunch of boys from school one day down to David Bell's shipyard in Buffalo to witness the launching of the propeller MERCHANT. If there were any pennies in our bunch, every one of them would have been bet that she would go directly to the bottom when launched, and there would have been no takers.

McDougall says the first iron boat built on the Great Lakes was the United States naval ship MICHIGAN, then the MERCHANT owned by the Evans Line of Buffalo and soon after the PHILADELPHIA. All this in 1858. In 1871 the INDIA, CHINA and JAPAN belonging to the Anchor line were built.

I am inflicting this letter on you in the hopes that you might be interested.

George G. Barnum

Up and Down the Great Lakes

Package Freight Lines Organize—H. E. Gilpin Dies—Correction is Made—Heads Towing Co.—Douglas Brews Dies

PACKAGE freight lines on the Great Lakes recently completed the formation of the association mentioned in the March issue of MARINE REVIEW. This association has now filed an agreement with the United States shipping board.

The following have been elected to serve as officers and directors: Officers: H. T. Hoopes chairman, general manager of the Minnesota-Atlantic Transit Co.; F. W. Dever, secretary and chairman of rate committee, freight traffic manager of the Great Lakes Transit Corp.; and William K. Muir, treasurer, general superintendent, Detroit & Cleveland Navigation Co.

The directors are H. T. Hoopes, H. S. Noble, president of the Great Lakes Transit Corp.; George B. Wright, freight manager, Detroit and Cleveland Navigation Co.; and P. J. Swartz, general manager, Cleveland and Buffalo Transit Co.

The obvious purpose of the organization is to stabilize rates and to deal with other problems which confront the package freight operators on the Great Lakes.

H. E. Gilpin Dies

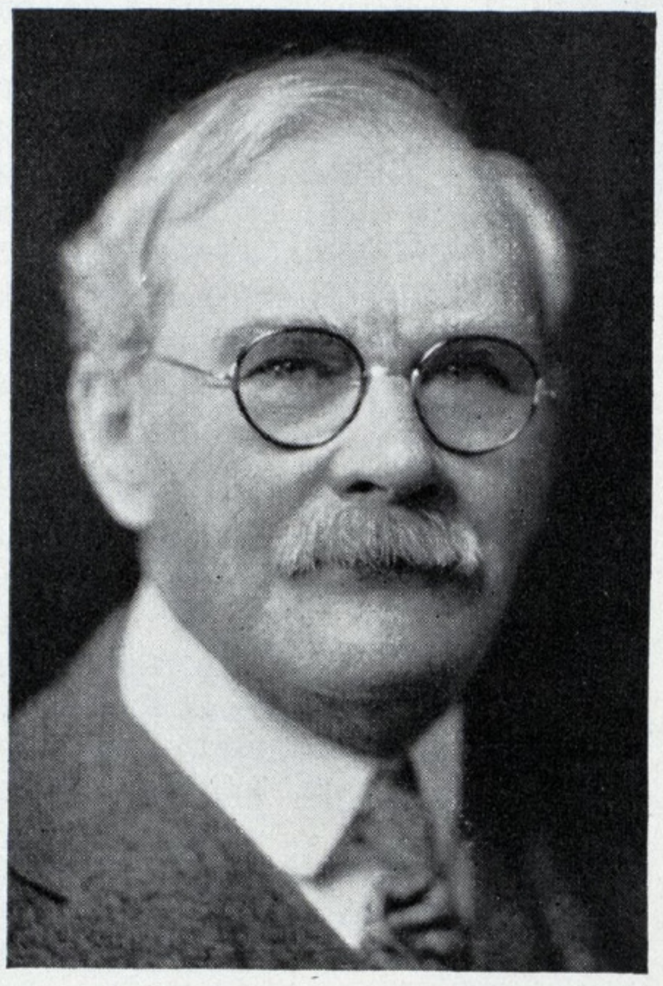
In the death of H. E. Gilpin, president of the Great Lakes Towing Co., on Feb. 24, shipping circles on the Great Lakes loses another of its well known figures. He died of a heart attack at his home, Shaker Heights.

Mr. Gilpin had been president of the Great Lakes Towing Co. for the last 15 years. This company operates a large fleet of towboats on the Great Lakes from Duluth to Buffalo.

Before entering the shipping field, Mr. Gilpin had had long training in railroad operation, entering the employ of the Philadelphia & Reading as a rodman in the engineering department in 1880. He received rapid promotion and in 1887 he was appointed assistant engineer for the Buffalo division of the New York Central. In the same year he began his connections with the Erie railroad which continued for many years. In 1909 he was appointed general agent of the traffic department of the Erie railroad at Cleveland, and shortly after general agent in Cleveland.

He continued in this office until his election as president of the Great Lakes Towing Co. in 1918. At this time the late Frederick D. Underwood, then president of the Erie, thought so highly of Mr. Gilpin that he was extended "an indefinite furlough," but he never returned to the railroad.

As head of the towing company, Mr. Gilpin was widely known and had the friendliest of relations with shipping men on the Great Lakes. His personality attracted all who had the privilege of knowing him. One of his characteristics was great enthusiasm in all matters, practical and cultural. Among his clubs were Rowfant, Union and



Athletic. He was also a member of the Cleveland Chamber of Commerce, Cleveland traffic club and the Historical Society of Pennsylvania. He was 70 years of age and is survived by his wife, one daughter and two sons.

Correction is Made

General Motorship Corp. directs our attention to the fact that the statement appearing in the article by Arthur J. Owen, page 35, March issue, MARINE REVIEW, to the effect that the motorships CLEVELANDER and DETROITER are under charter to the Seaboard-Great Lakes Corp. is erroneous.

These vessels are not under charter to anyone nor is any charter contemplated. The vessels are now and will continue to be operated in the same trade as formerly by the owner, General Motorship Corp., 17 Battery place, New York.

Heads Towing Company

G. A. Tomlinson, head of one of the largest independent fleets on the lakes, was elected president of the Great Lakes Towing Co., Cleveland, March 23, succeeding the late H. E. Gilpin. The duties of his new office will not be strange to Mr. Tomlinson as he has been chairman of the board of the towing company for sometime past, and will continue in this office also.

He has many varied interests in lake shipping besides the Tomlinson fleet. He is chairman of the board of the American Ship Building Co. and president of the Cleveland & Buffalo Transit Co. He is also connected officially with a number of other marine companies. A sketch of Mr. Tomlinson's career was published in MARINE REVIEW for January, 1930, on the occasion of his election as president of the Cleveland & Buffalo Transit Co.

Douglas Brews Dies

Douglas Brews, retired supervising engineer of the M. A. Hanna Co., died at Phoenix, Ariz., on Feb. 22. He was born in Scotland about 73 years ago. On first coming to the United States he went to work for the Globe Iron Works, Cleveland. In 1885 he went out as assistant engineer on the steam yacht WINIFRED, returning to the Globe Iron Works after two years, where he continued until 1901.

At that time he joined the engineering department of the M. A. Hanna Co. and supervised and brought out the steamers RANDOLPH F. WARNER, G. A. FLAGG and WILLIAM F. Fitch. He came ashore as fleet engineer in 1905 and supervised the building of a number of steamers added to the fleet.

At the end of 1930 Mr. Brews retired as supervising engineer of the M. A. Hanna Co. after 25 years of service. He was one of the most popular and esteemed engineers on the lakes. Vessel owners, captains and engineers at the time of his retirement joined in giving him a farewell luncheon and presented him a testimonial album autographed by his many friends. He is survived by his wife.

Reviews of Late Books

Designing for Arc Welding, published by Lincoln Electric Co., Cleveland, and edited by A. F. Davis, vice president of that company; cloth, 416 pages, 9 x 6 inches, numerous illustrations. Contains selected prize winning papers submitted in the $17,500, second Lincoln prize competition; supplied by MARINE REVIEW for $2.15 plus 15 cents postage and in Europe by the Penton Publishing Co., Caxton House, London.

Five sections cover machinery, shipbuilding, buildings and bridges, large containers, pipe and fittings. In each case fundamentals of design are explained to make them applicable to other industries. Each chapter is by an authority in that particular field. The total represents the important contributions of welding to industry over the past two years. The papers cover the subjects in great detail and are profusely illustrated.

The competition which called forth these papers was set up by the Lincoln company. The jury of award was made up of members of the electrical engineering department of Ohio State university, Columbus, O., under the chairmanship of E. E. Dreese, head of the department.

Brown's Rule of the Road Manual, by W. K. Stewart, paper 154 pages, 7 x 4½ inches, illustrated by colored diagrams seventh edition, published by Brown, Son & Ferguson Ltd., Glasgow, supplied by MARINE REVIEW for 65 cents plus 15 cents postage, and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

The rule of the road at sea, illustrated by colored diagrams, also the uniform system of buoyage, wreck-marking, regulation for light vessels and other pertinent matters fully illustrated, are thoroughly and authoritatively covered in this manual now brought up-to-date in its seventh edition. The author holds a certificate as extra master and is head of the School of navigation, Dundee Technical college, Dundee, Scotland.

Rules have been formulated for the movement of vessels in order to prevent the possibility of collision. These rules are international in character since they apply to ships of all maritime nations. They are incorporated in 31 articles entitled *"International Regulations for Preventing Collisions at sea."*

For many years this book has served as a guide to the board of trade examinations on the rule of the road. It has now been revised to bring it into line with modern requirements. New chapters, diagrams, questions and answers have been inserted, and the subject matter has been remodeled to secure a sequence of explanation suitable for careful study at sea by all candidates for all grades of board of trade certificates of compentency. The articles in question conform with the international convention for safety of life at sea, 1929.

Every ship officer should find this book of exceptional value as an aid in perfecting himself in the duties of his calling. This book will also be valuable to men engaged in marine insurance, salvage and adjusting.

Yearbook of the Harbor Technical Society (in German), Jahrbuch der Hafenbautechnischen Gesellschaft, Vol. XII, 1930-31, issued in Berlin, Germany 1932, 327 pages, 307 illustrations, published by Hafenbautechnischen Gesellschaft, Baurat Baritsch, Hamburg, reviewed by R. S. MacElwee.

The twelfth yearbook of the Harbor Technical society has just been published. It maintains the usual high quality of typography and text material which has made these annuals the outstanding publications in any language in the field of port, terminal and waterway engineering. The publication of this splendid volume at this time is an achievement in the face of great financial difficulties common to all engineering societies.

The book may be procured through MARINE REVIEW or directly through the secretary of Hafenbautechnischen Gesellschaft, Baurat Baritsch, Dalmannstrasse 1, Hamburg Germany. Copies of the annual are received automatically by members of the society. Eligible to membership are port terminal engineers, and public port officials.

This annual contains very interesting discussions by outstanding authorities. The material is grouped under three heads:

1. Business reports
2. Papers read at annual conventions
3. Contributions of special articles

The frontispiece is an engraved portrait of the late Dr. Eng. Ludwig Wendemuth, for many years director of the port of Hamburg, with which he was connected since 1884. As the right hand of the late Dr. Bubendey, he was the real builder of the port of Hamburg and its directing genius since Dr. Dubendey, died in 1919. His passing is a loss to all port and terminal engineers and officials the world over.

In the group of papers read are several interesting subjects, especially the papers on the question of using one story or many storied transit sheds and one on port warehousing. These subjects are thoroughly covered and verbatim records of discussions are also given, thus forming a valuable source of information on these important factors in terminal design and layout.

Under contributions there are several notable articles such as the new transport terminals for bulk commodities at the seaport of Dordrecht, Holland; and the extensions of the J. P. Coenhafen at Amsterdam; two examples of ocean vessel quays in direct connection with basins for inland waterways vessels; the steel plant harbor of Friedrich Krupp on the Rhine-Herne canal; the coal transport ports of the new Wesel-Datteln canal; experiences with wave action in constructing the port of Helgoland; round swells and their relationship to the design of harbor breakwaters; and various launching methods for reinforced concrete caissons with special consideration of construction upon floating dry docks.

Among the papers read at the 1931 meeting published in the annual are: *"Operation of the Port of Emden;" "Shore Protection Construction of the East Friesland Islands;" "Port Administration at Home and Abroad;" "The Improvement Construction of the Dordmund-Ems Canal;" "The Passenger Terminal at Cherbourg and the Quay Wall Construction;" "Modern Crane Installations at the port of Dunkerque;"* and *"New Cranes at French and Belgian Ports."*

The paper referred to above on *"Port Administration at Home and Abroad"* is by Dr. Eng. Lohmeyer of the port of Hamburg and covers pages 181 to 227 inclusive. This discussion in much detail with great depth of discernment, based upon Dr. Lohmeyer's years of practical experience in the administration of one of the largest and perhaps the best laid out and administered sea port on the earth, makes his comments worthy of close attention and consideration. The subject is discussed under a number of headings so that the reader looking for information may readily go to that part in which he is directly interested.

The twelfth yearbook of the Harbor Technical Society is a gold mine of information in its field.

Promotion of Seamen's Welfare in Ports, by the International Labor Conference, Geneva; paper, 171 pages, 8½ x 5½ inches; issued abroad and available in the United States only through the American agent, the World Peace Foundation, Boston, for 50 cents.

This book covers the second discussion, Report III, on the subject by the International Labor Conference. Chapter I consists of replies of the governments subdivided under the different headings of the questionnaire in alphabetical order of countries. Chapter II is devoted to a general survey of the problem in the light of the replies of the governments and Chapter III contains the conclusions and text of a draft recommendation.

Personal Sketches of Marine Men

J. Lewis Luckenbach, President, American Bureau of Shipping

By Ben K. Price

HE BRINGS to his responsible position a wide experience in connection with the design, construction and operation of ships.

A MEMBER of a well known shipping family, he is thoroughly familiar with the problems of the American shipbuilder and operator.

DURING the war he had charge of the construction of merchant vessels in Japan and China for the United States Shipping Board.

RECENT election of J. Lewis Luckenbach as president of the American Bureau of Shipping, New York city, is befitting recognition of valued services to the bureau and to marine shipping in general. Executive vice president of the bureau since 1927 and in direct charge since 1932, Mr. Luckenbach has brought to his duties a thorough familiarity with the design, construction and operation of ships, both freight and passenger. In his new position he succeeds the late Capt. Charles A. McAllister, who died more than a year ago.

Of a family of shipping men, Mr. Luckenbach was born in Kingston, N. Y. He was graduated from Holbrooks Military academy, Ossining, N. Y., in 1902, and received a degree in civil engineering from Princeton university four years later, to follow up with special work at Pratt Institute, Brooklyn, N. Y. Following practical experience in ship construction, particularly at the plant of the Empire Repair Co., Brooklyn, an affiliate of the Luckenbach Steamship Co., as well as in ship operation, he went to the Pacific coast for Luckenbach in 1912 upon the entry of the company's ships in intercoastal service. Later he returned to New York in charge of design and construction of the company's ships.

In 1918 he was sent by Edward N. Hurley, of the United States shipping board, to the Orient, where he had charge of the construction of vessels for the shipping board, 35 in Japan and four in China. These ships were of a total of 45 contracted for by the shipping board with Oriental yards, involving a cost of $73,000,000 and a total deadweight of 375,000 tons.

These contracts came about because there was a severe shortage of shipbuilding capacity in the United States and a great need for steel in Japan, and it is interesting to recall that this resulted in a special arrangement under which the United States furnished, in addition to the steel required for the construction of these ships, a ton for each deadweight ton of ships delivered, at the domestic prices fixed by the United States government as a war measure against a soaring market.

In Japan, Mr. Luckenbach found modern equipment in most yards, but in China the excessive amount of manpower was reflected. Mechanical equipment was confined largely to such ordinary tools as shears; wherever a hand operation was possible, it was the usual procedure. Rivets, for instance, were driven by hand, and while the job, according to Mr. Luckenbach, did not present the finished appearance of the hydraulically driven operation, it proved thoroughly serviceable.

Two years later he returned to the United States as vice president of the Luckenbach Steamship Co., in charge of maintenance, repairs and physical operations, and was active in the settlement of government service claims of the company in connection with ships taken over during the war.

In 1925 he returned to private life, later to become a member of the board of managers of the American Bureau of Shipping, which he now heads.

While asserting that the year started off none too auspiciously, Mr. Luckenbach is confident that the carrying out of existing mail contracts, the necessary extension of the mail contract system and more general support of their own merchant marine by American travelers and shippers will make improvement inevitable.

Mr. Luckenbach firmly declares that the ocean mail payments made to ship operators have been returned many times to the public through large expenditures for equipment and maintenance and operating supplies as well as by protecting American interests generally.

These payments are not simply compensation for carrying mail, he asserts but insurance that regular and adequate facilities will be available for our commerce to the important ports of the world.

Mr. Luckenbach is a member of the council of the Society of Naval Architects and Marine Engineers, and is identified with numerous other organizations, including the Princeton club, Block Hall, the Nassau Country club and the Beaver Dam winter sports club, all in or adjacent to the New York metropolitan district. He resides at Glen Cove, L. I.

Correct Time on Ships

(*Continued from page* 41)

fering with its steady running. Of course, if the accumulated rate becomes so big as to be unwieldy, the chronometer is sent ashore to the opticians to be put right again.

Before the days of marine chronometers, navigators when out of sight of land had a very hazy notion of their whereabouts as longitude was unobtainable. The British government, recognizing the need for an accurate clock, offered a prize of £20,000 for one that would enable the navigator to find his longitude with a certain degree of accuracy and over a specified time under ordinary seagoing conditions. The first to be completed was by John Harrison in 1736, after years of study. It underwent many trials and improvements, and made two test voyages to America for the satisfaction of the commissioners, and finally in 1764 it fulfilled all the conditions and Harrison was awarded the prize. Despite the fact that one hundred and seventy years have passed, the modern marine chronometer is built on substantially the same lines as the chronometer by John Harrison, a high tribute indeed to the skill and ingenuity of that persevering watch maker.

In the old days it was customary for captains of ships to buy their own chronometers, and carry them about with them from ship to ship as their most prized and valuable possessions. Nowadays the chronometers are part of the ship's equipment and are supplied by the owners.

J. Lewis Luckenbach, president of the American Bureau of Shipping, New York city, sailed March 21 on the S. S. EXCALIBUR for a visit to affiliated offices of the bureau abroad. He will be gone about six weeks.

Admiral Griffin Dies

On Feb. 21, Rear Admiral Robert S. Griffin, U. S. N. (retired) died at the Naval hospital, Washington, in his seventy-fifth year. He was retired in 1921 on reaching the age limit of 64, and had had a distinguished career as an engineer officer of the navy. During the World war he was engineer-in-chief of the United States navy and chief of the bureau of steam engineering, having been originally appointed engineer-in-chief and chief of the bureau in 1913. A precedent was sent in his reappointment to that office by President Wilson in 1917. He continued to serve in this capacity until his retirement.

Admiral Griffin was born in Fredericksburg, Va., Sept. 27, 1857. He graduated from the United States Naval academy in 1878. Colombia university conferred on him the degree of doctor of science in 1915. Stevens Institute of Technology also honored him with a degree of doctor of engineering. In his long service in the navy, he did much to advance marine engineering. He was a member of the Society of Naval Architects and Marine Engineers. He held the United States distinguished service medal and was a commander of the French Legion of Honor.

Cordillera Is Launched

The motorship CORDILLERA, sister ship of the motorship CARIBIA, which recently entered the Central American services of the Hamburg-American line was launched at Blohm & Voss, Hamburg on March 4. The new vessel, also intended for passenger and freight service between Europe and Central America, will have a gross tonnage of 12,000 and will make a speed of 17 knots. Her passenger accommodations are similar to those of the CARIBIA. On her maiden voyage, which will take place about Aug. 1, she will make a cruise to the Atlantic islands.

Interlake Steamship Co.

Pickands, Mather & Co., Cleveland, operating manager of the Interlake Steamship Co., has issued the following announcement:

The department concerned with the operation of the fleet of the Interlake Steamship Co. and movement of freight on the Great Lakes will hereafter be known as the marine department.

Capt. T. F. Zealand has been appointed marine superintendent in charge of physical properties, personnel and operation of the fleet, in place of the late Capt. W. G. Stewart.

Personnel of the marine department will consist of the following: C. C. Canfield, manager; George S. Kendrick, assistant manager; Capt. T. F. Zealand, marine superintendent; T. C. Gignac, dispatcher; C. E. Collins, fleet engineer; William Fetting, assistant fleet engineer; and R. A. Blood, in charge of accounting.

On Mar. 15 the International Paint Co. Inc., 21 West street, New York, announced a change in its Baltimore representation. The arrangement with G. H. Seiler has been terminated and the agency has been placed with Robert C. Herd & Co. Inc., Mercantile Trust building, Baltimore.

The wrought iron diesel tug, JOSEPH GOLDBERGER, for quarantine boarding duty of the United States Public Health Service, designed by associate naval architect, P. W. Clark, and built by Spedden Shipbuilding Co. Inc., Baltimore, Md., was recently delivered under her own power at New Orleans.

Intercoastal Shipping Rates Are Stabilized

Stabilization of intercoastal rates is expected to result in the enactment into law of the Copeland-Davis bill. The new law signed by the President March 3, requires filing, with United States shipping board, rate schedules of steamship lines engaged in intercoastal shipping using the Panama canal and including contract carriers by water.

Though the measure does not fix or control rates it is expected filing of schedules, so that they will be publicly known by all interested parties, will have the effect of doing away with rate wars which have heretofore kept this branch of our shipping in more or less turmoil and uncertainty.

By provisions of the new act the shipping board it is understood is authorized to hold hearings upon the lawfulness of any rates filed with it and to suspend proposed rates pending such hearing. This, it is believed, will prevent discriminations and rebates and will have the effect of keeping lines to a strict adherence of the rates. Until the law becomes effective June 1, the intercoastal conference is taking action to arrive at temporary agreements extending present rates through the intervening period. It is expected that a permanent conference in conformity with the new federal regulations as incorporated in the law, will be formed.

New Sales Organization

The B. F. Goodrich Rubber Co., Akron, O., has appointed Lucien Q. Moffitt Inc., exclusive distributor for Goodrich cutless rubber bearings in the United States and Canada.

The new company is headed by Lucien Q. Moffitt, who has been manager of the cutless rubber bearing department of the Goodrich company since this new development in water lubricated bearings was first placed on the market several years ago. The new distributing company is located at Akron, O., in the Peoples Bank building.

The Sperry Gyroscope Co., Brooklyn, N. Y., has equipped the United Fruit liner, PETEN, with a complete gyro-compass system including a gyro compass, two unit gyro pilot, bearing repeater, steering repeater, course recorder and rudder indicator.

The same company also equipped the Furness-Bermuda liner, QUEEN OF BERMUDA with a gyro-compass system including a steering repeater, bearing repeater and course recorder.

A complete gyro-compass equipment has been ordered for the lighthouse tender CEDAR attached to the Alaskan district. Equipment will be installed during the regular spring overhaul.

Marine Review

Reg. U.S. Pat. Off.

The National Publication Covering the Business of Transportation by Water

Todd Facilities for Ship Repair

A WIDE knowledge and experience among the technical and operating personnel that is uniformly distributed among the several shipyards of Todd in Atlantic, Gulf and Pacific ports is a distinguishing feature of Todd Service to marine owners and operators.

When to this Service is added the exceptional facilities and equipment for routine or emergency major or minor operations of every marine character upon all classes and sizes of vessels, the dominant nature of Todd Service is manifest.

TODD SHIPYARDS CORPORATION

Main Office: 25 *Broadway, New York*

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Robins Dry Dock & Repair Co.
Erie Basin, Brooklyn, N. Y.
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Todd Dry Dock Engineering & Repair Corp.
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Todd Combustion Equipment, Inc.
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Todd Shipbuilding & Dry Dock Co., Inc.
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Todd Engineering Dry Dock & Repair Co., Inc.
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Todd Dry Docks, Inc.
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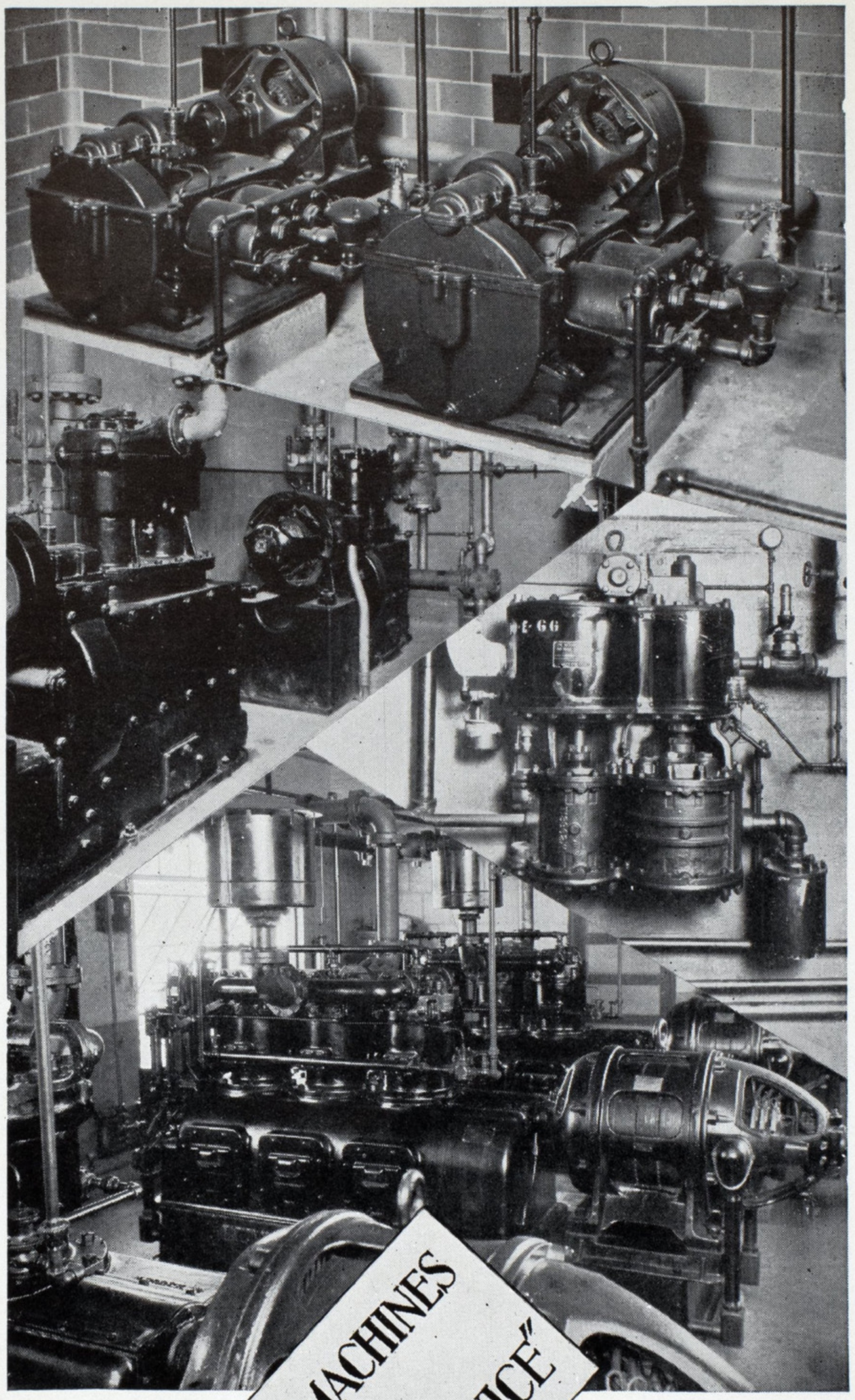
LARGEST DRY DOCK *in* NEW YORK HARBOR

TODD
NEW YORK, U.S.A.

VARIETY IN UNIFORMITY

Westinghouse Air Compressors are available in many types and sizes—ranging from 2½ to 300 cu. ft. displacement---for every conceivable pneumatic requirement in marine service—aboard ship or ashore . . . While there is diversity in form and purpose there is uniformity in quality and performance . . . These compressors possess unique design features and are well built. They're noted for reliable, economical operation, and for unusually long life.



"QUALITY MACHINES FOR QUALITY SERVICE"

WESTINGHOUSE
TRACTION BRAKE CO.
Industrial Division
Pittsburgh Penna.

Westinghouse AIR COMPRESSORS

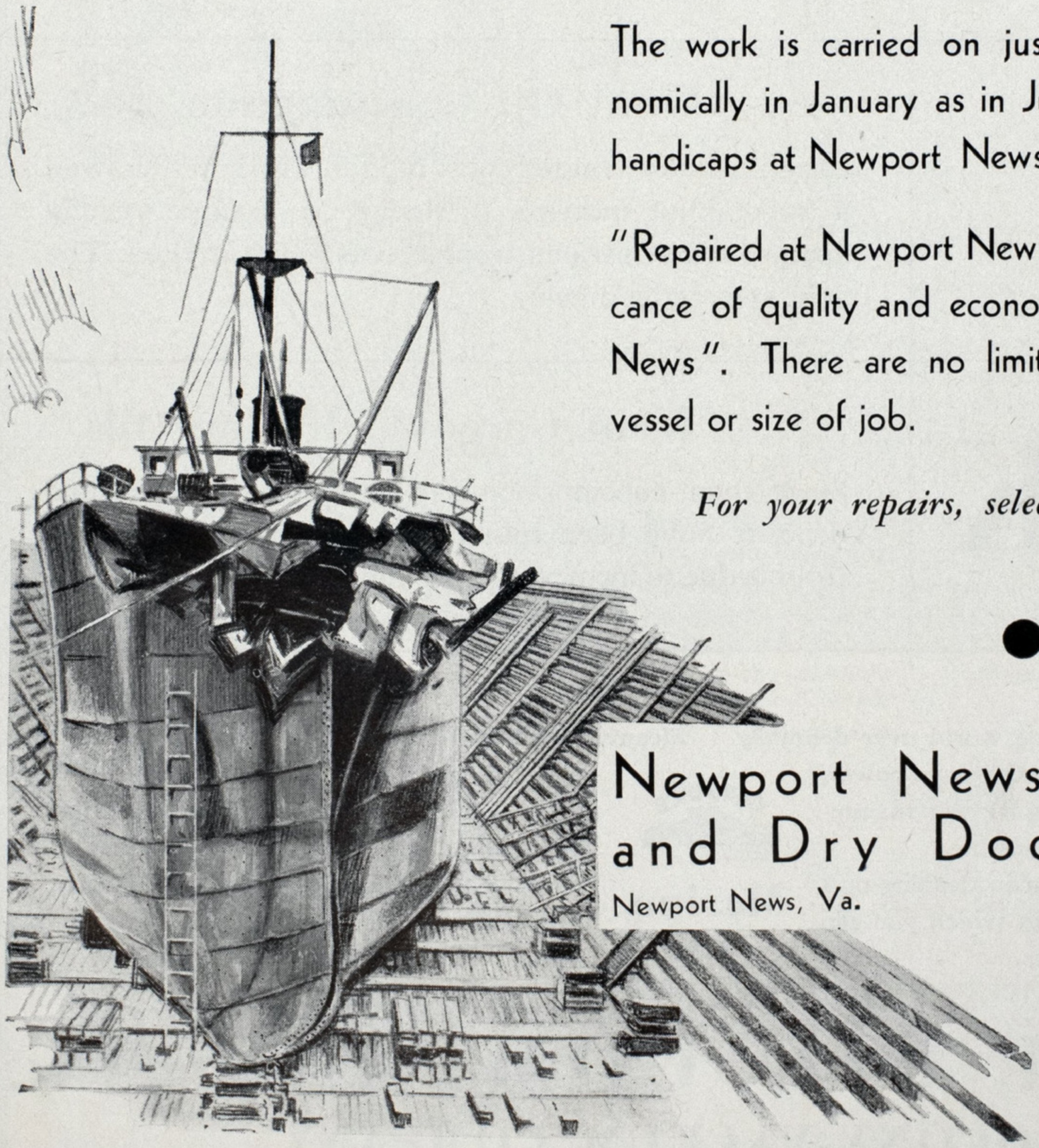
(9113-B)

Vol. 63, No. 4, April, 1933, issue of MARINE REVIEW, published monthly at Cleveland, O. Entered as second class matter at the post office, Cleveland, Ohio, under the act of March 3, 1879. Subscription price $3 a year in U. S.; Canada, $4; Great Britain £1:45; single copies, 35c

NEWPORT NEWS

REPAIR FACILITIES

SAVE TIME AND MONEY



THREE large graving docks . . . steel, iron and brass foundries . . . large forge and machine shops, completely equipped with modern tools . . . an efficient organization, trained in the latest methods for economical and rapid completion of ship work.

The work is carried on just as efficiently and economically in January as in June—there are no winter handicaps at Newport News.

"Repaired at Newport News" carries the same significance of quality and economy as "Built at Newport News". There are no limitations as to the type of vessel or size of job.

For your repairs, select those who build.

●

Newport News Shipbuilding and Dry Dock Company

Newport News, Va. 90 Broad St., New York City

What a Transatlantic Line learned about

Saving money on Oil

For several years, Gargoyle Marine Oils had been giving excellent service in the Diesel auxiliaries of a prominent transatlantic liner. But her owners were trying to save money on operating costs. "Perhaps we can save a few dollars on oil," was the general thought. So . . . .

OUT	**. . . . Came Gargoyle Marine Oils** For the next three months, accurate records were kept of oil consumption. These records quickly proved that the new oils actually cost *more* money because . . . .
UP	**. . . . Went Oil Consumption 20%** In addition to increased consumption, inspection showed a substantial increase in sludge. It became readily apparent that serious trouble was being invited. The next step came quickly . . . .
BACK	**. . . . Went Gargoyle Marine Oils** Since then, consumption has returned to normal and deposits have been minimized. All danger of engine trouble due to incorrect lubrication has been eliminated.

PERFORMANCE records the world over definitely prove that Gargoyle Marine Oils save power, reduce fuel and oil consumption, lower maintenance charges, and increase engine life.

The Vacuum representative in any leading port will be glad to suggest ways in which you can lower today's engine-room costs.

GARGOYLE

Marine Oils

Meanwhile, it will pay you to send for one of these helpful books: "Marine Lubrication — Motor ships", "Turbine-Propelled Steamships", or "Steamships with Reciprocating Engines". They will be sent you free — with no obligation. Address Vacuum Oil Company, Inc., Marine Sales Dept. F-4, 26 Broadway, New York City.

VACUUM OIL COMPANY, INC.

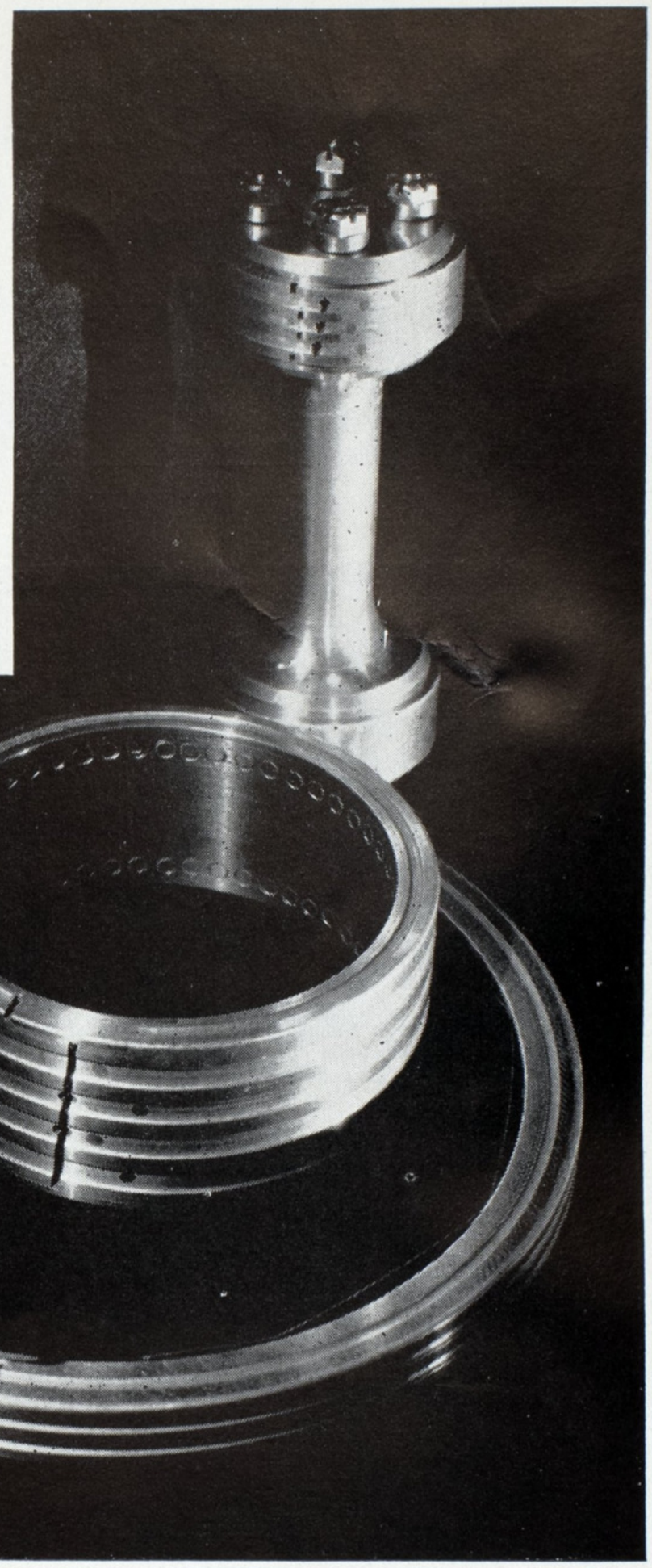
A SOCONY-VACUUM COMPANY

BODENLOS *Balanced* PISTON RINGS

and improved

PISTON VALVE RINGS

Five Years in Service and as Good as New!



FIVE years ago, American Ship installed the first of these new type piston rings on the main engine of a large bulk freighter. Today they are still in use, giving *complete satisfaction.* And inspection shows that they are almost as good as new!

Users uniformly tell us that Bodenlos rings stand up better. There is a very definite reason for this service: These balanced rings turn the disadvantage of having steam leak behind the rings into an advantage. Steam pressure outward is partially offset by steam pressure inward. Thus the strain on the metal is reduced yet there is still pressure enough to keep the seal between rings and cylinder walls steam-tight; and you get better lubrication . . efficiency . . . and ECONOMY!

For Steam engines of all types and sizes

Bodenlos rings provide a sure cure for three common piston ring faults, for:

1 They prevent "steam set."

2 They prevent piston slap.

3 They prevent scored cylinders.

In addition, they offer three positive advantages:

1 They give full power.

2 They save coal.

3 They save repairs.

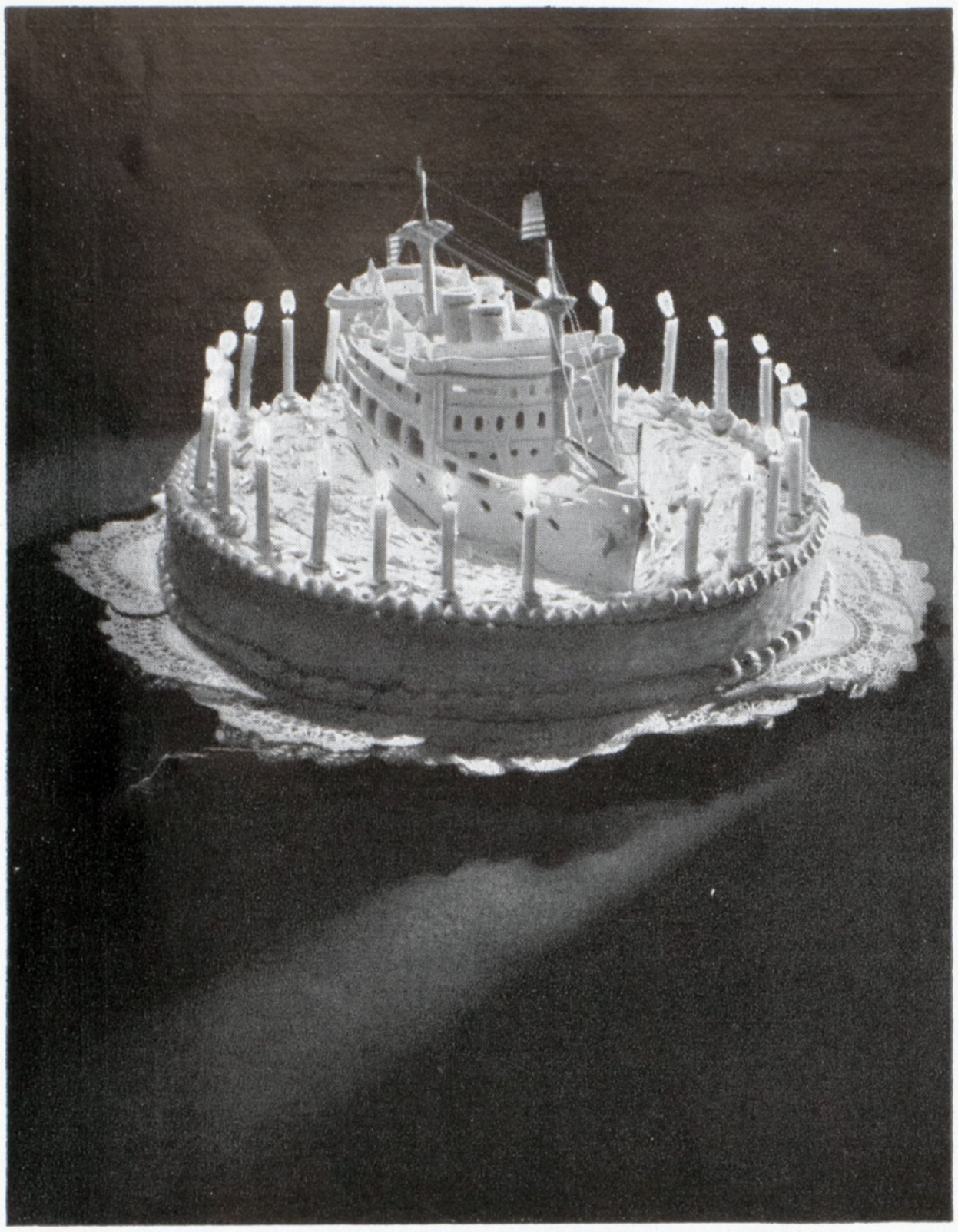
• • • •

Write for the folder which tells the complete story about these new economy-bringing rings.

The AMERICAN SHIP BUILDING CO.

Main Office: Foot of West 54th Street, Cleveland, Ohio

CLEVELAND	LORAIN	BUFFALO	SOUTH CHICAGO	SUPERIOR
American Ship Building Co.	*American Ship Building Co.*	*Buffalo Dry Dock Company*	*Chicago Ship Building Co.*	*Superior Shipbuilding Co.*



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WITH G-E PROPULSION EQUIPMENT

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QUIRIGUA
VERAGUA
SANTA ELENA
SANTA LUCIA
SANTA PAULA
SANTA ROSA

25th ANNIVERSARY

THIS YEAR marks the twenty-fifth anniversary of the turbine-electric ship and of General Electric's entrance into the field of ship propulsion.

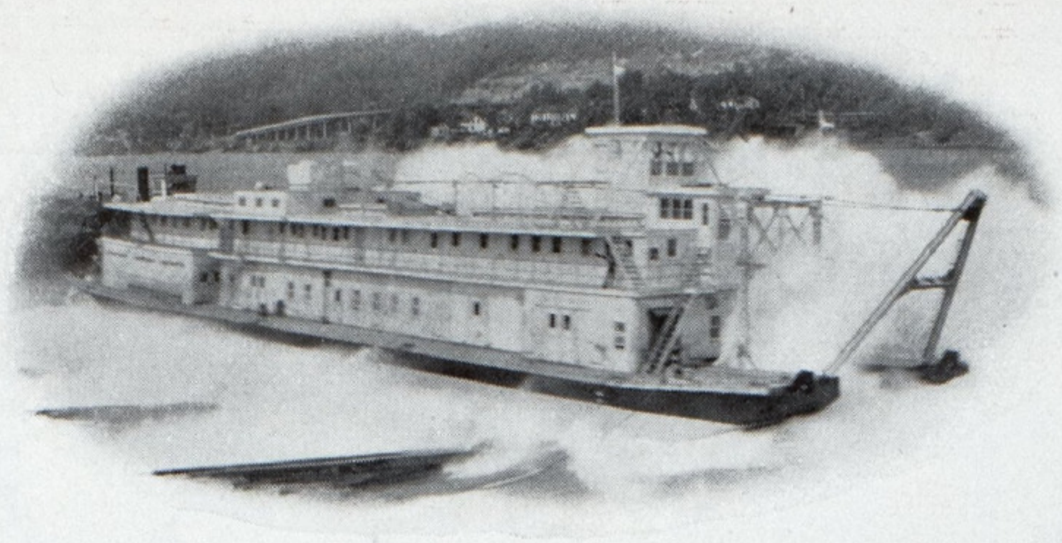
In 1908, the fireboats *Joseph Medill* and *Graeme Stewart* were put into service by the City of Chicago. They were the first ships in the world to be equipped with turbine-electric drive. They were G-E equipped.

Since then, General Electric and associated companies have furnished propulsion equipment for completed ships and ships now under construction totalling more than three million shaft horsepower. General Electric Company, Schenectady, N. Y.

173-38

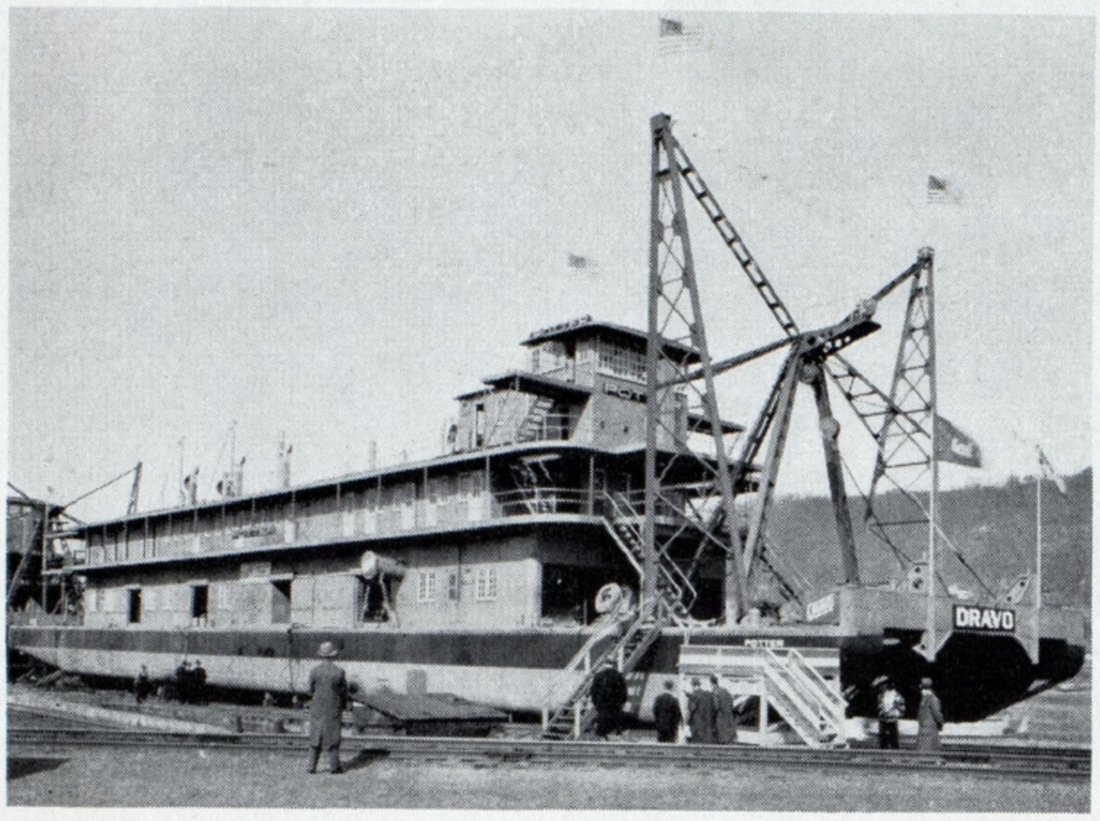
GENERAL ELECTRIC

1152
STEEL
HULLS
SINCE
1917



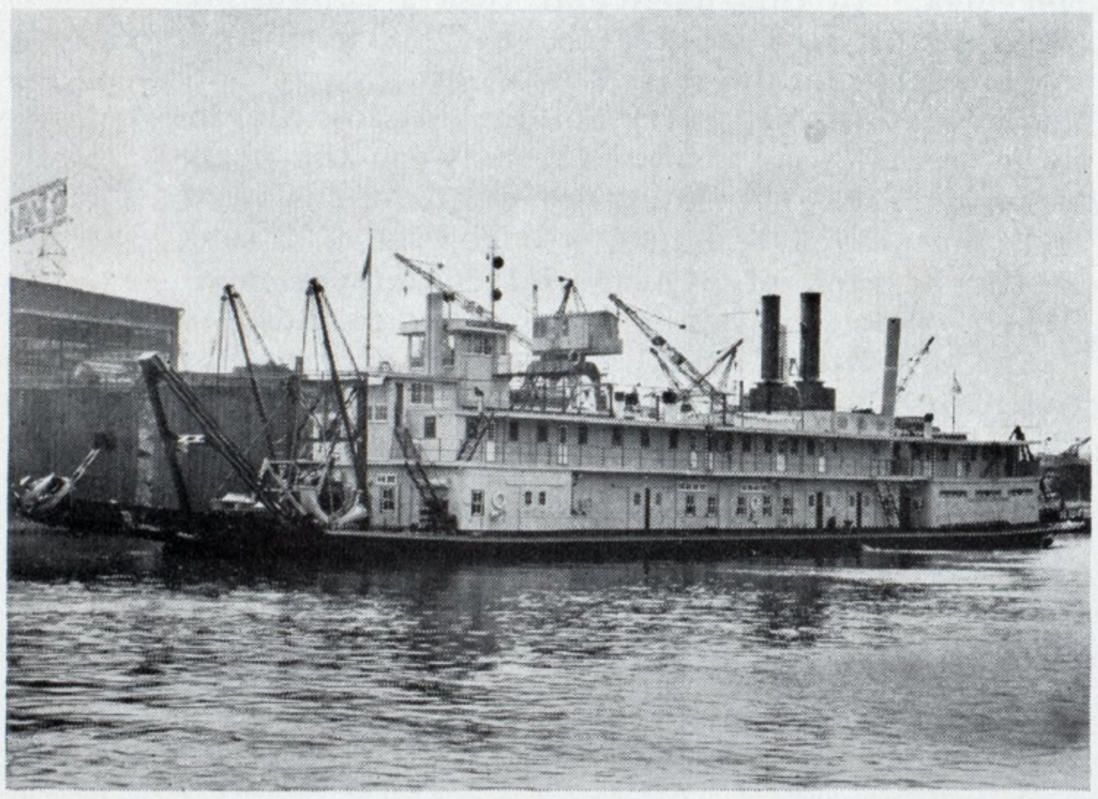
5
SUPER
DREDGES
DURING
1932

U. S. DREDGE GRAFTON
Launched Oct. 1, 1932

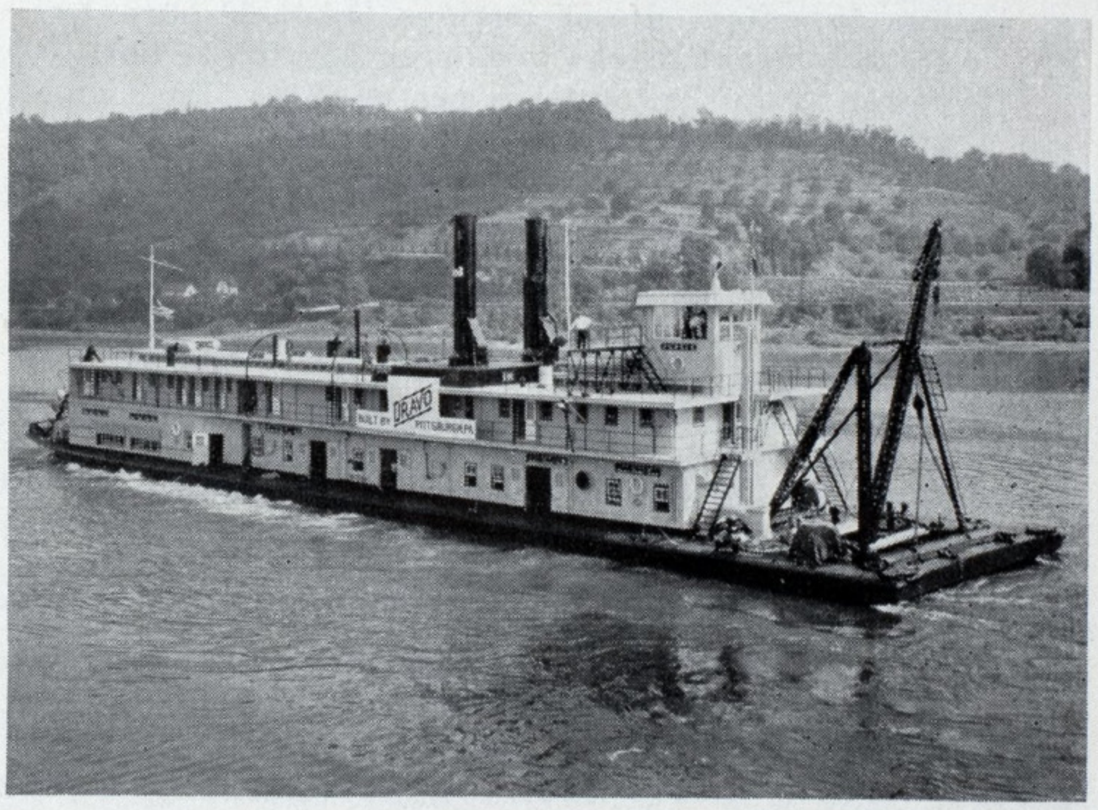


U. S. DREDGE POTTER
Launched Feb. 26, 1932

U. S. DREDGE OCKERSON
Launched March 22, 1932



U. S. DREDGE ST. GENEVIEVE
Launched Oct. 22, 1932



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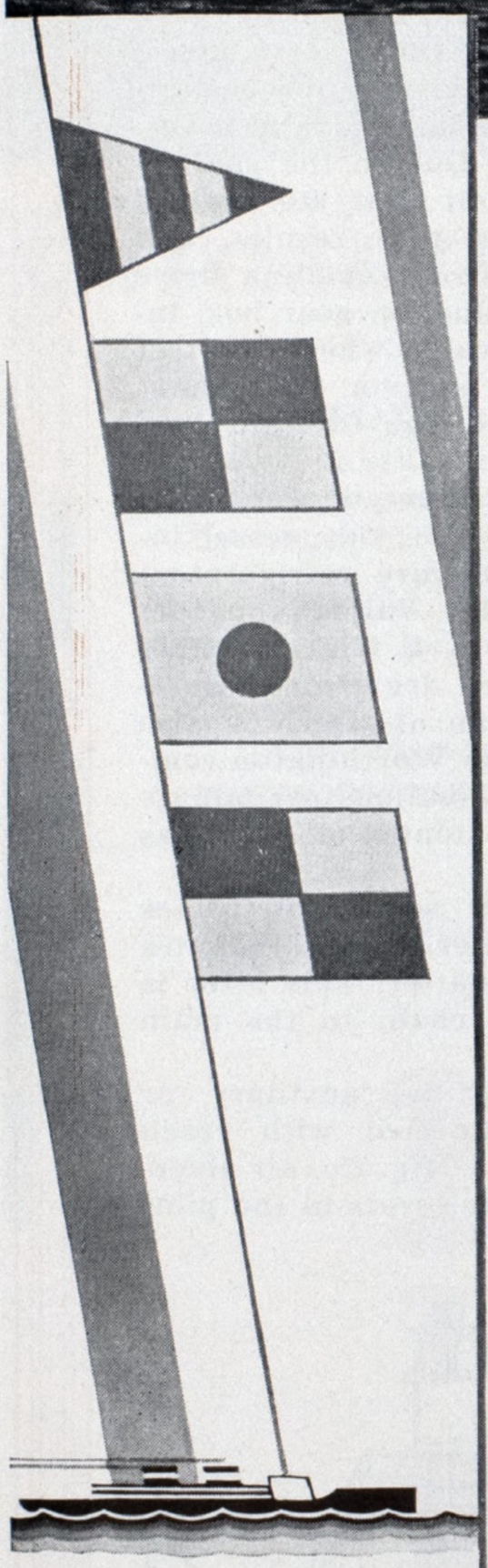
WINTON-DIESEL
powers
Lighthouse Tender Cherry

Confidence built on the sound foundation of PERFORMANCE in hundreds of thousands of sea miles = that is the reason why Winton-Diesel Engines power such boats as the Cherry, illustrated above. This modern lighthouse tender, built by Leathem D. Smith Dock Company for the U. S. Department of Commerce, is dependably powered with a Model 8-133, eight-cylinder, airless injection, direct-reversible Winton-Diesel Engine, developing 300 h.p. at 350 r.p.m. Auxiliary equipment includes the Model 139 Winton Air Compressors, each driven by a 5 h.p. electric motor. The Cherry has an overall length of 86 feet, 3 inches; beam, molded, 22 feet; depth, 10 feet, 6 inches. In various branches of government service, Winton-Diesel Engines have established, in the past ten years, a record of operation that may well be observed by owners of every type of commercial vessel.

WINTON ENGINE CORPORATION
Cleveland, Ohio, U. S. A.

A NEW SOVEREIGN OF THE PACIFIC

S.S. LURLINE



— *100% equipped with Westinghouse Auxiliary Motor Drive*

ON January 12, the *s. s.* Lurline, last of three new passenger ships of the famous Matson Line, sailed from New York on her 30,000-mile maiden tour via the Panama Canal, California, the South Seas and the Orient. She is a 9-deck superliner over 600 feet long, with accommodations for nearly 800 passengers.

The electric power requirements of this modern addition to America's merchant fleet are supplied by four Westinghouse turbine-generator sets which produce a total of 2000 kw. Westinghouse motors and control also power the deck and underdeck auxiliaries, assuring economical and dependable service with the quietness of operation demanded today of all modern passenger ships.

In her modern galley, Westinghouse electric ranges and bake ovens will make possible the finest cuisine with the utmost economy. And in her spacious public rooms, staterooms and crew's quarters more than 200 Westinghouse marine type fans add to the comfort of the passengers and crew.

The selection of electrically driven deck and underdeck auxiliaries by the Matson Line for the Lurline and her sister-ships, the Monterey and Mariposa, is another confirmation of the growing preference of progressive steamship owners and operators for electrically driven auxiliary machinery.

Westinghouse

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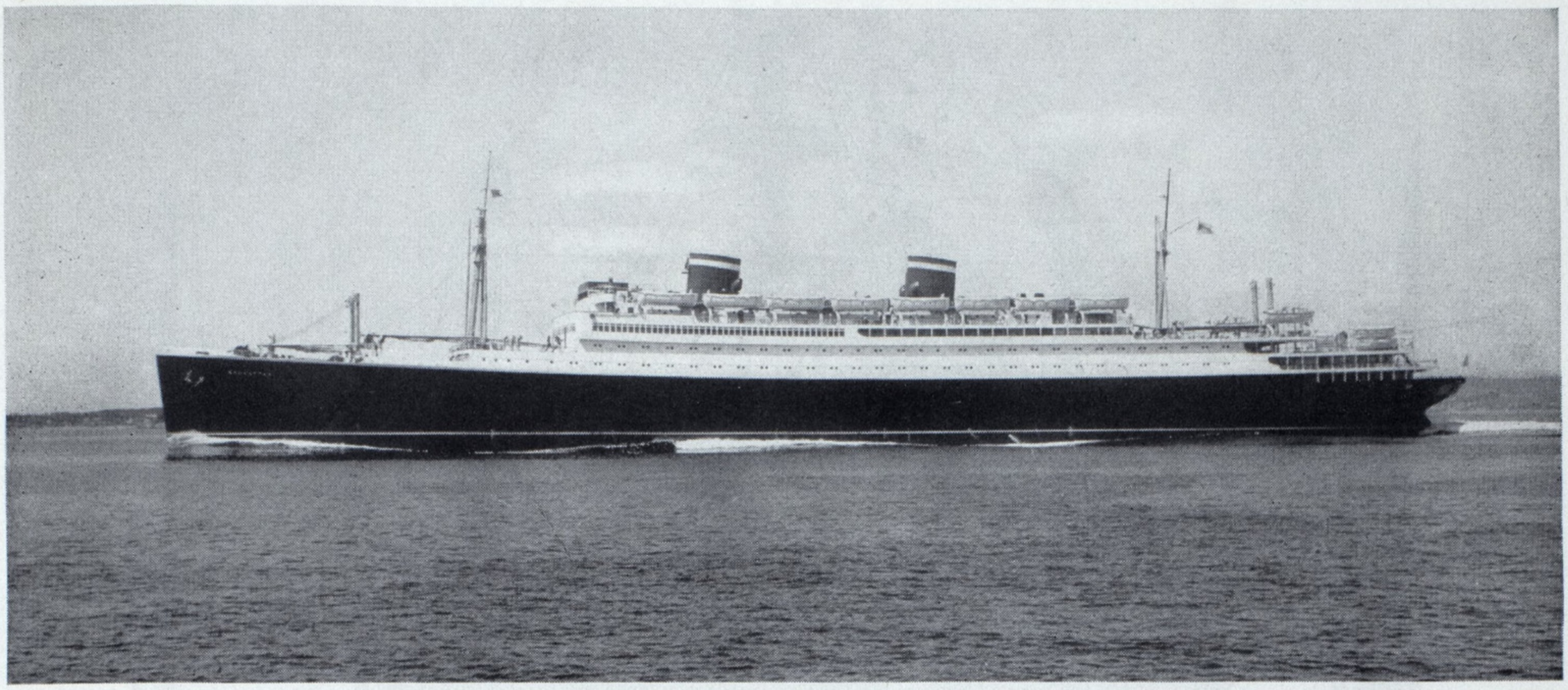
Quality workmanship guarantees every Westinghouse product

S. S. MANHATTAN



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NO-OX-ID was used in the S. S. Manhattan and S. S. Washington to coat all of the water ballast tanks in the double bottom and also the fore and after peak tanks. The owners wanted reliable protection and used the one material that had been proven best by years of experience.

NO-OX-ID combines chemical and mechanical rust protection and is absolutely reliable for long service under most severe conditions. It is easily applied and is reasonable in cost.

Our marine representatives are experienced and fully qualified to give reliable suggestions regarding your rust problems.

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TRADE MARK

The Original Rust Preventive

S. S. WASHINGTON

Review of Distinctive Ships Shows

The launching of the *Santa Lucia*

Continuance of Babcock & Wilcox Leadership

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MARK TWAIN
SANTA ROSA
TUSCALOOSA
SANTA LUCIA
MINNEAPOLIS
TALAMANCA
MANHATTAN
WASHINGTON
INDIANAPOLIS
NEW ORLEANS
SAN FRANCISCO
SAINTE GENEVIEVE
SEATRAIN HAVANA
SEATRAIN NEW YORK

These ships launched, built, or contracted for in 1932 are equipped with Babcock & Wilcox Boilers, except, where indicated by*, auxiliary boiler equipment. Those appearing in color have been selected by the Editors of Marine Review as distinctive ships, and are featured in this issue.

The accompanying list of ships launched, built, or contracted for in 1932 and equipped with Babcock & Wilcox Boilers evidences the continuing leadership of The Babcock & Wilcox Company in marine propulsion equipment.

This leadership has been established by the merits of carefully designed and superior water-tube marine boilers, and has been maintained by constant application to the development of higher efficiencies and greater economies through the use of Modern Steam.

The exceptional facilities and the practical experience of The Babcock & Wilcox Company are at the disposal of those requiring efficiency, economy and dependability in marine boilers and boiler auxiliary equipment of standard and special designs.

The Babcock & Wilcox Company . . 85 Liberty St. . . New York

BURTON	DELVALLE	M. W. ADAMS
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DELMUNDO	PATCHOGUE	POINT ANCHA

The above ships were reconditioned with Babcock & Wilcox Marine Equipment.

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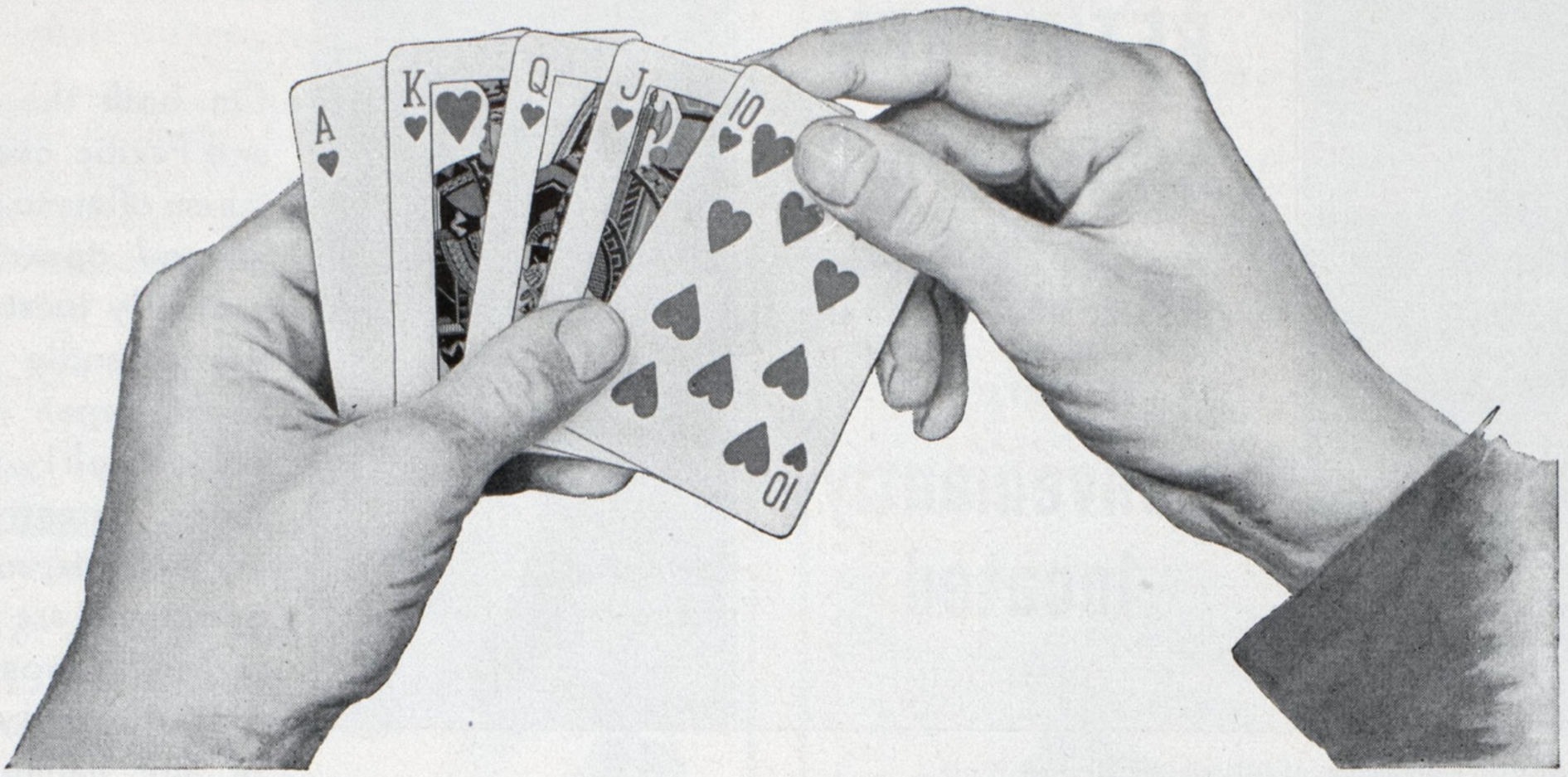

Don't Throw Down A Winning Hand

AMERICA has for years been passing up benefits that belong to her. We have given to foreign-flag ships a priceless franchise which should be exercised to our own profit. American ships are fueled in the United States. They are provisioned in the United States. . . Crews that operate them are, in the greater part, paid in the United States. The executive staffs of the shipping companies are maintained in the United States. Taxes are paid here, dividends are distributed here. Over 83 percent of your freight bill or passage money when paid to an American shipping line is spent in this country. . . . . Patronize American-flag ships and conserve these values for America.

DON'T PASS UP PROFITS

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Main Office and Yard:
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New York Office:
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On both the Atlantic and Pacific coasts Bethlehem offers to shipowners and operators conveniently located facilities to handle all types of ship-repair jobs. . . . Thoroughly modern shops, extensive docking facilities, and trained personnel, are available to handle promptly and economically repairs of any nature to any type or size of vessel.

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SAN FRANCISCO HARBOR—Union Plant: Potrero, Hunters Point and Alameda Works.
LOS ANGELES HARBOR—Union Plant: San Pedro Works.

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John J. Boland — Adam E. Cornelius

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Boilers, Tanks, Stacks, Structural Work and Castings
Boiler Repairing Promptly Attended to Day or Night
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Works: 36-40 Illinois Street - BUFFALO, N. Y.

FOR SALE

Double End Ferryboat

40 Vehicle Capacity
Beam Engine

Ready for immediate service. For further particulars or inspection—communicate with P. W. Pierson, Asst. to Vice-President, 80 Park Place, Newark, N. J. Phone Market 2-7000.

RIVERSIDE and FORT LEE FERRY CO.

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WANTED: ONE MARINE ENGINE 18 x 20 or equal, high pressure. Address Box 433, MARINE REVIEW, Penton Building, Cleveland, Ohio.

TUG PUCKASHAW—WOOD HULL. GROSS TONS—231. NET TONS—93. Length—96 ft. Width—26 ft. Draught 12.4 ft. Engine—500 h.p. 18½ x 40 high pressure, complete with towing engine. Can tow 8000 cords pulpwood. Address Box 436, MARINE REVIEW, Penton Bldg., Cleveland, Ohio.

FOR SALE OR CHARTER. STEAM STEEL TUG "LORENE" 54 x 12 x 5 in good shape; ½ yard dipper dredge, pile driver, including scow; 2000 lb. hammer; service scows, etc. Address Box 434, MARINE REVIEW, Penton Bldg., Cleveland, Ohio.

FOR SALE: 95 FT. STEAMER. STEEL HULL. WRITE FOR INFORmation. DIVISION OF CONSERVATION, Columbus, Ohio.

FOR SALE: WOODEN HULL TUG REBUILT IN 1930, 66 FT. KEEL, 17′ 6″ beam and 10 ft. draft; boiler 7-6, 13 ft. fire box and 100 lbs. steam Steeple compound engine 14 high-30 low and 22″ stroke. swings 7 ft. wheel with Dake steering engine. Would make a good hull for Diesel engine. Address Box 435, MARINE REVIEW, Penton Bldg., Cleveland, Ohio.

HAVE YOU A BOAT OR EQUIPMENT FOR SALE?

The classified section of MARINE REVIEW is for your convenience—its value is proving worthwhile to everyone who uses it to buy and sell. If you want to buy or sell ships or marine equipment—need a man for your organization—make it known to the entire marine industry through the use of classified advertising in MARINE REVIEW.
Mail copy for your advertisement in the May issue today, so it reaches us before April 20.

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104-114 E. Dedham St., Boston, Mass.

MANUFACTURERS OF

Accurate "Non-corrosive" Pressure and Recording Gauges, Revolution Counters, Marine Clocks.

Dead Weight Gage Testers.

Marine, Safety and Relief Valves for all pressures.

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Extra Heavy Renewable Globe, Angle and Check Valves.

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HIGH GRADE THROUGHOUT
SPECIFY AND ORDER THE BEST.

Branches: CHICAGO PITTSBURGH NEW YORK

Greater Safety in this New Life Preserver . . .

approved by U. S. Government

Revolutionary in design and construction, the new Tapatco Life Preserver turns wearer over on his back, even though he be unconscious, prevents floating with head down, and retains buoyance for days. Filling is of Private Estates Kapok, five times more buoyant than cork. Five pounds lighter in weight than cork. Easy to store. Wears longer—does not deteriorate. Write for descriptive folder and prices.

The American Pad & Textile Co.

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Established 1837

Diving Apparatus and Submarine Armor
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The Invincible Nozzle

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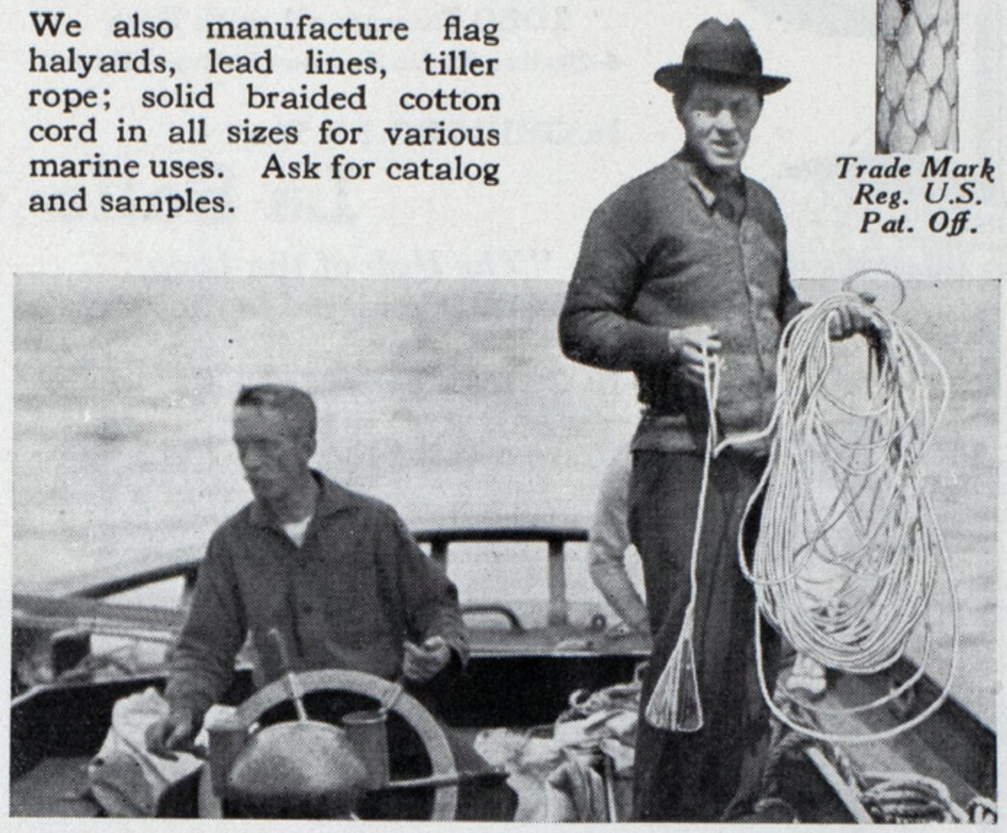
Trade Mark Reg. U.S. Pat. Off.

Smooth, tough and durable; no adulterating material to stiffen it and decrease strength and durability. Solid braided of extra quality cotton yarn. Uniform in size and quality. Easily identified by the colored spots, our trade mark.

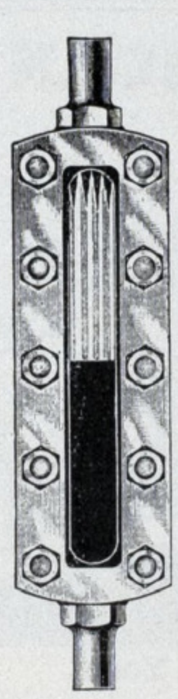
We also manufacture flag halyards, lead lines, tiller rope; solid braided cotton cord in all sizes for various marine uses. Ask for catalog and samples.



SAMSON CORDAGE WORKS

89 BROAD STREET BOSTON, MASS.

TRADE MARK



REFLEX WATER GAGES

Used on all types of boilers by all the Principal Navies of the world

"The Water Shows Black"

ADVANTAGES: Quick and reliable observation of the water level. Safe, sure and durable at high pressure. Not affected by cold air drafts. Most effective protection against injuries to boilers and workmen. Easily applied to all types of gage glass fittings.

When filled with **WATER** the Reflex Gage always appears **BLACK.** When empty it instantly shows **WHITE.** No mistake possible. This feature alone is worth many times the cost of the Reflex.

Send for catalog of Water Gage Apparatus

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JERGUSON GAGE & VALVE CO.

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We can fill your order for any technical book in print.

Tell us your needs and we will be glad to recommend the best books for your purpose.

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Book Department

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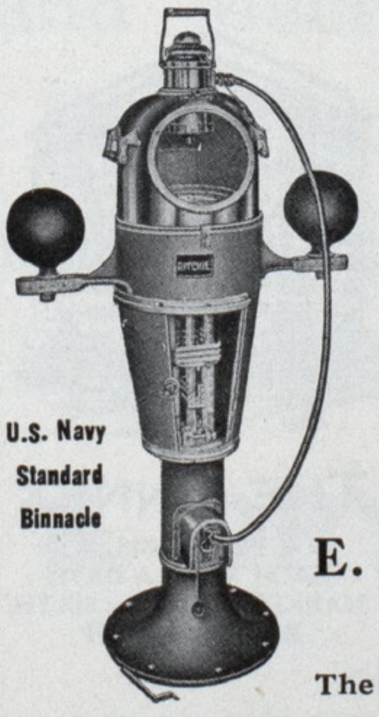

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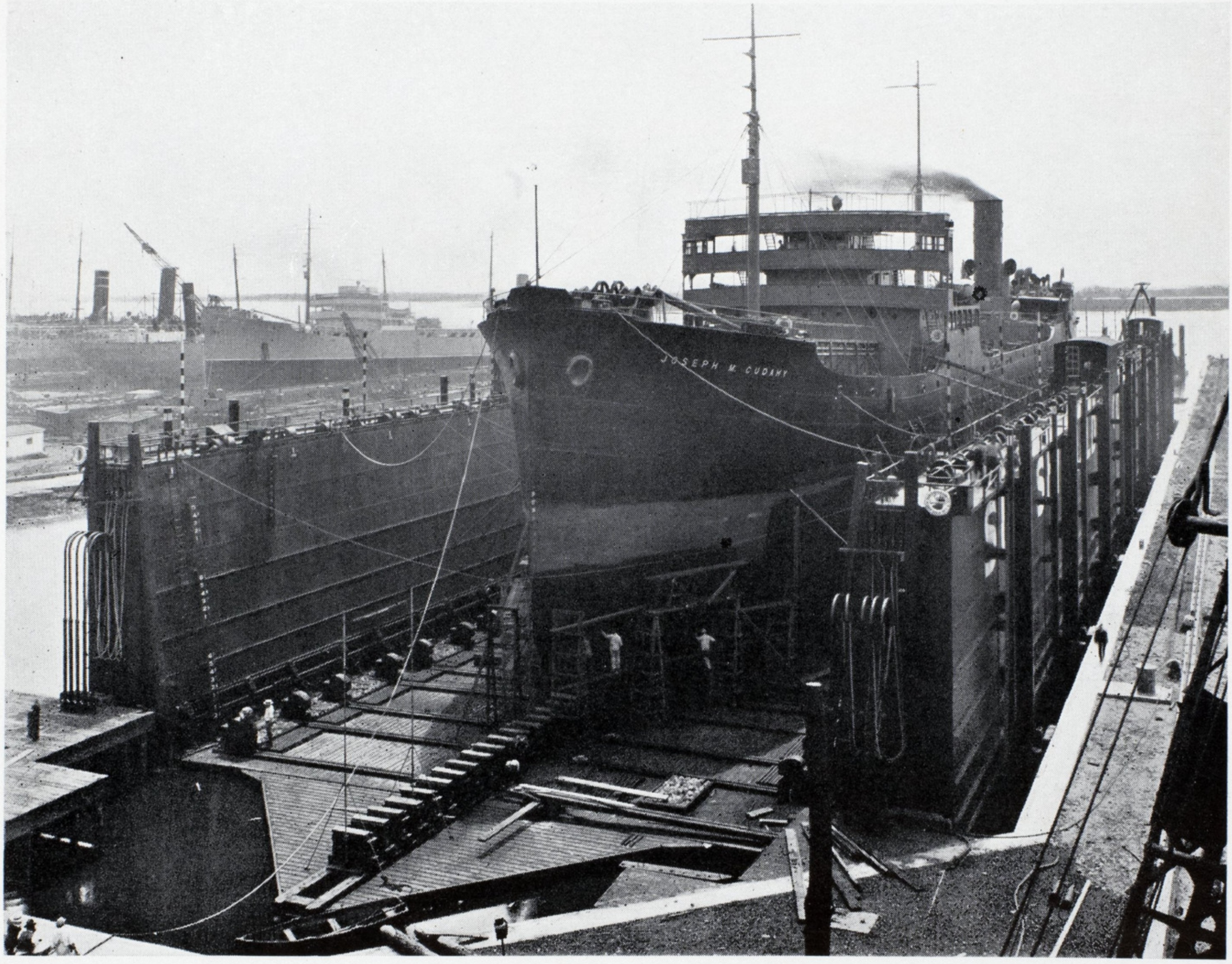

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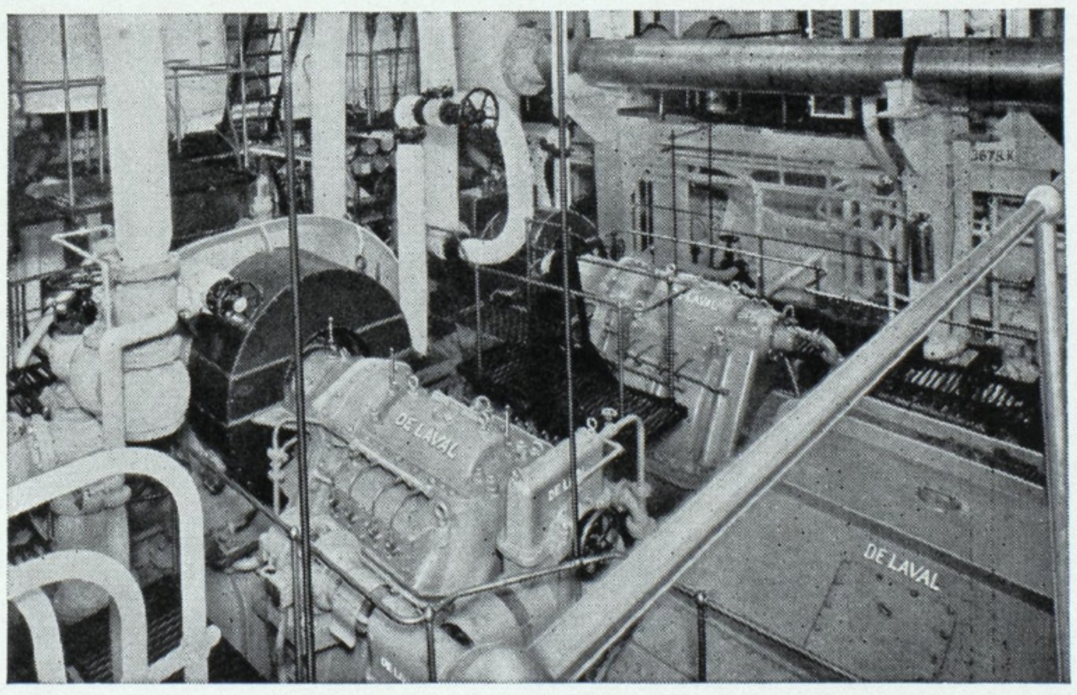

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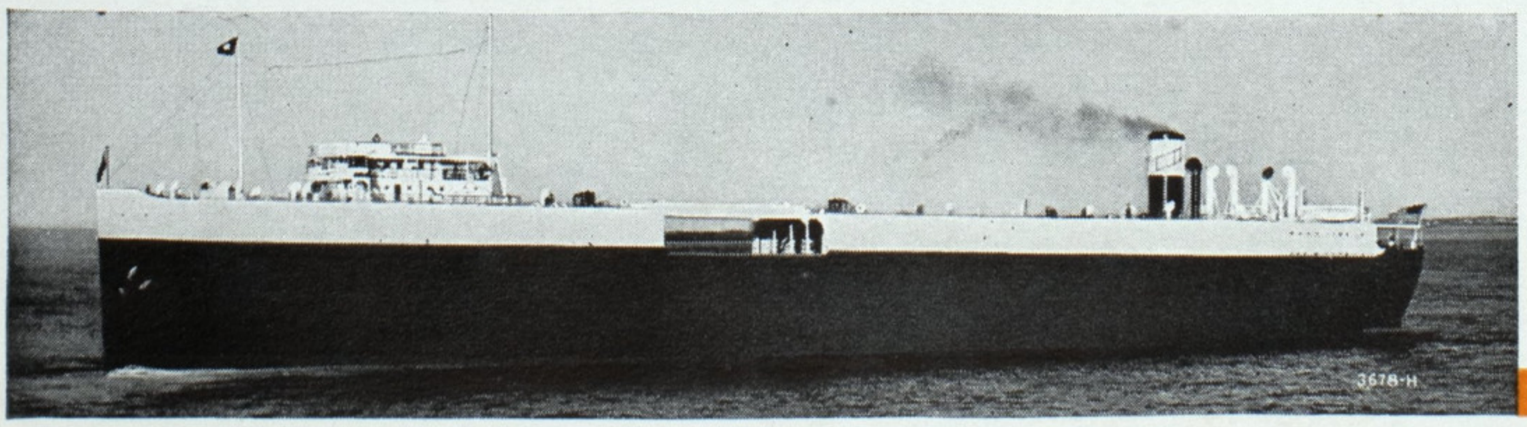

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